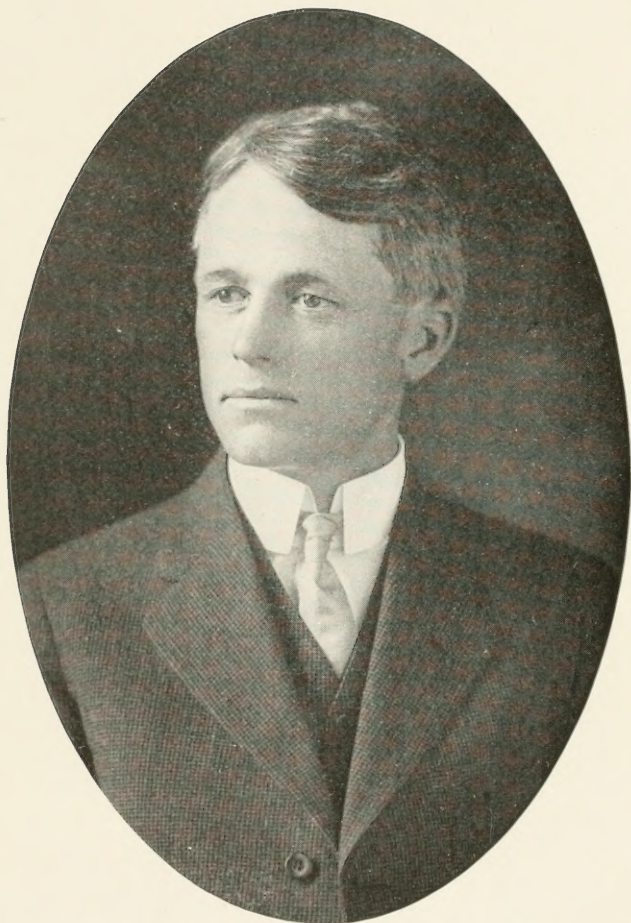


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PRESIDENT J. POMEROY MUNSON, GRAND RAPIDS.

FORTY-SECOND ANNUAL REPORT

OF THE

SECRETARY

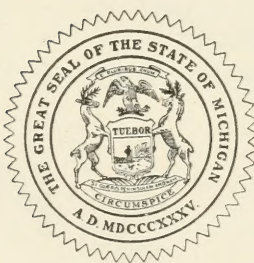
OF THE

STATE HORTICULTURAL SOCIETY

OF

MICHIGAN

FOR THE YEAR 1912



BY AUTHORITY

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REPORT OF THE SECRETARY OF THE MICHIGAN STATE
HORTICULTURAL SOCIETY.

FENNVILLE, MICHIGAN,

January 1, 1913.

TO HON. WOODBRIDGE N. FERRIS, *Governor of the State of Michigan:*

In compliance with legal requirements, I have the honor to submit herewith the accompanying report of 1912, with supplementary papers.

I believe that a careful review of the papers and discussions that follow will be of great value in helping the development of the horticultural possibilities of our great State.

Respectfully yours,

CHARLES E. BASSETT,

Secretary Michigan State Horticultural Society.

OFFICERS OF THE STATE HORTICULTURAL SOCIETY FOR 1913.

PRESIDENT—J. POMEROY MUNSON, Grand Rapids.

VICE-PRESIDENT—CHARLES A. PRATT, Benton Harbor.

SECRETARY—CHARLES E. BASSETT, Fennville.

TREASURER—ROBERT A. SMYTHE, Benton Harbor.

EXECUTIVE BOARD.

CHARLES A. PRATT, Benton Harbor, 3 years.

PAUL ROSE, Elberta, 3 years.

CHARLES F. HALE, Grand Rapids, 2 years.

H. J. EUSTACE, Agricultural College, 2 years.

FRANK A. WILKEN, South Haven, 1 year.

W. F. HAWXHURST, Saline, 1 year.

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FRUIT CATALOGUE—H. J. EUSTACE, East Lansing.

NEW FRUITS—FRANK A. WILKEN, South Haven;.

CHAS. F. HALE, Grand Rapids.

FINANCE—CHAS. A. PRATT, Benton Harbor.

W. F. HAWXHURST, Saline.

ENTOMOLOGY—R. H. PETTIT, East Lansing.

VEGETABLE PHYSIOLOGY—G. C. COONS, East Lansing.

FORESTRY—CHAS. W. GARFIELD, Grand Rapids.

LEGISLATION—R. A. SMYTHE, Benton Harbor.

C. E. BASSETT, Fennville.

LANDSCAPE GARDENING—THOS. GUNSON, East Lansing.

REPORT OF THE FORTY-SECOND ANNUAL MEETING OF THE
MICHIGAN STATE HORTICULTURAL SOCIETY, HELD
AT GRAND RAPIDS, MICHIGAN, NOVEM-
BER 12, 13, 14, 1912.

The meeting was promptly called to order by President T. A. Far-
rand.

INVOCATION BY MR. EDWARD HUTCHINS.

"Our Father who art in Heaven we raise our hearts, as we are at this moment our voices, to Thee in gratitude. Thou who inhabitest Eternity, Thou who are the Alpha and Omega, the beginning and the end, the great first cause of all things, we adore Thy name because of Thy wonderful majesty and of thy wonderful mercy. We would thank Thee for Thy preserving care which has been over us during the year that is past and gone. We would thank Thee for the wonderful prosperity with which our fields have been blessed; we thank Thee for the blessings and privileges that have been ours to enjoy. And now while we are together here for a short time to deliberate upon the best means for carrying forward the work Thou hast committed to us, we would implore Thy divine blessing. Give us a keen perception of right and wrong; help us to have high standards in all our work and carry it forward with an eye single to Thy glory. And while we are here let brotherly good feeling go from one to another, and may we feel at the close of this session that it has been one of the best that we have had, and may we return to our homes with a full determination to improve upon the lessons of the past and make our work more worthy of the high calling to which Thou hast called us; and while Thou dost minister to our bodily needs, we pray that Thou wilt also minister to our spiritual needs. Lead and guide us in paths of righteousness and at last receive us to Thyself above. We ask it all in Thy name. Amen."

THE PRESIDENT'S ADDRESS.

According to the program, the President's Annual Address is next in order. Judging the future by the past I think the members of this society know what they may expect in the President's Annual Address. I might deliver a long speech discussing the different phases of our work but what would be the benefit of this? I wish to take up just as little time in this direction as possible, for we are here for business. I may say, however, that if there ever was a time when we needed to be alert, when we as fruit-growers should get right down to business,

it is now; for with the problems that have confronted us during the past seasons, we need to seriously, soberly and earnestly consider them and seek to avoid mistakes that many of us have made in the past year. The year that has gone by has been one where many of us have met our "Waterloo" and I feel sometimes as though in many respects we have been a failure in another way. Personally I feel that way, and especially as by my advice a good many in years past have been induced to go into the apple business and today they are plying me with questions and advice as to how they can get out of the orchard business what they were to believe was in it but which they have been unable to secure. This past year they have raised their apples; they have got fruit but there are no buyers in the field, and they do not know what to do with their products.

This is not the condition that is peculiar to our own state alone, it is general. Orchardists of other states have met with the same difficulty.

I cannot believe that the comparatively few hundreds of people who have been induced to go into this business have been able to raise so much fruit that there is such an enormous over-production as to cause the present low price. Especially do I think so when there are right here in our own country ninety-five million of people to eat it for nine months of the year. The whole trouble I believe is that there is something wrong in the marketing. If we can do anything to help that end of the problem it is the thing we must do. We must try to get at the bottom of this matter and inaugurate some plans or methods by which our fruits can be marketed and we receive something like a price commensurate with the costs of production.

This will probably all come out later in the discussion and now without any further words go on and take up the first thing on the program.

Before we take up the regular program, the first topic for consideration is: "How Best to Feed the Apple Orchard," by Mr. Luther E. Hall, of Ionia, who will address you.

HOW BEST TO FEED THE APPLE ORCHARD.

LUTHER E. HALL, IONIA.

Mr. President, Ladies and Gentlemen—When your Secretary asked me to prepare something on this topic, he intimated that he would like to have it very brief and to the point.

Now the topic of feeding the apple orchard may be made very brief, and I will try to be brief, but I hope I may be able to contribute a few hints that may help in feeding the apple orchard so as to get it to a condition of productiveness.

In the first place I want to describe the conditions under which we are working, and then you will better understand our methods. Our soil, in the state of nature, was covered with white-oak, hickory, beech, maple, basswood and elm; a heavy loam; one of those soils good to



Benton Gebhardt of Hart, harvesting sweet cherries, clipping the stems and letting the fruit fall on a canvas on the ground.



A bunch of fruit men at summer orchard meeting in Berrien county.

produce wheat, oats, corn, hay and a general diversity of farm crops.

On this same orchard we produced fourteen tons of clean beets after the tare was taken while the trees were growing, per acre. This will give you an idea of the kind of soil that it is.

This orchard that I am speaking of, was planted twenty-one years ago last spring. It has produced seven crops, commencing to bear fourteen years from the planting.

Our plan, and it is one that we have followed for several years, is a compromise between clean cultivation and grass mulch or along that line. We plow once a year, in the spring as soon as the ground is in condition to work. After getting it in condition, we sow Canada field peas, two bushels to the acre. When the peas have matured we turn in the hogs.

And right here I want to say that I have been asked about having hogs run in the orchard. I have answered this question a good many times and I would like to make this statement here now so that it will go on record, if any body has had trees injured by hogs it is because he had too many hogs or not enough orchard and did not feed his hogs well enough. The destiny of a hog is to eat and to be eaten; and that is the only use for which a person should keep a hog.

After the peas have been harvested by the hogs, we spread shelled corn in the orchard. By this way we aim to have about five hogs to the acre and we rely upon our fertilizer which comes from the stock that eat the shelled corn, fed out on the open fields to hogs. We allow the hogs to remain in the orchard until the fruit begins to bear the limbs of the trees down within reach of the animals and then we take them out and keep them out until the fruit is picked. After which they are returned to pick up any apples that may be left and are kept in as long as the weather will permit.

We have used a little commercial fertilizer but the aim and object with us has been to get humus. If we can get this we can get everything else we want for the production of fruit.

I have no war to make on men who believe in clean culture except I do not believe that it applies to the apple orchard, the life of which should be from seventy-five to perhaps one hundred and twenty-five years.

I have trees that my father set out that are sixty-five years old and they are now just in their prime, producing excellent fruit and in good quantities.

It is my theory, and I think it is borne out in practice that a clean cultivation does not add anything to the fertility of the soil. It makes available the elements that are in the soil, but if we can grow Canada field peas, we can get all the nitrogen we need.

We get the nitrogen from the air. It is stored up in the product of the peas and goes back to the soil. There is plenty of evidence that we have sufficient nitrogen in the soil, as mushrooms grow very abundant and is a great place for our city friends to come out Sunday afternoons and gather them; and if we get humus we can unlock the store of phosphoric acid and potash that is in the soil; and there is plenty of it there for all time to come.

Our aim is to have everything made as near dormant in the orchard

during the progress of the growth of the fruit as possible. After the peas are harvested we go over the orchard with a mowing machine and clip off whatever weeds there are and we have the ground pretty thoroughly mulched with pea-straw and weeds. We had rather have weeds than bare ground, but we do not like to have weeds, we had rather have peas.

I need not tell you that this plan of enriching the orchard is not very expensive. When we can buy corn at sixty-seven cents and sell pork on foot for seven to ten cents the hog proposition will take care of itself, so we have been very liberal in this kind of fertilizer in the orchard. And I might say that when the hogs are not in there we have enough of the mulch to almost cover the soil. It is about all we can turn under with the ordinary plough the next spring. I think we get good results by having this ground covered with this mulch and we try to keep down all the drain from the soil while the fruit is in that critical condition of not having enough moisture during the month of August; however, we have had a plenty of it during the past two years, but this is the month that there is the greatest danger from this cause, and we have adopted this plan while the fruit was in the height of its development.

This is about all of our system of feeding the orchard and I do not know but it is far enough for me to go along on this line.

There are, however, some other conditions which make for successful apple growing that are not fully tied up in the feeding.

If we were to feed a horse or a dairy cow we would as far as possible eliminate all the conditions whereby they might consume food unprofitably, and this we aim to do for our orchard with the pruning shears. We wish the trees to bear fruit; at the same time we do not want them to over-bear. It has become an established fact that the core and the stem of the apple take more phosphoric acid than the pulp itself. The pulp is made up, according to analysis, of 92% of water and sunshine - no drain on the soil. We try to eliminate the unprofitable growth of small apples; and while this has been a discouraging year for apple growers I do not think we should lie down until we can make every apple as good as these here shown on this table. In a close tab kept on our packing we found that we were able to get about 75% of this kind.

This system has eliminated the Codling Moth. We are not troubled with it now at all. This year has been an unusually bad one for the fungus and we have had more difficulty along this line this year than from any or all other causes together.

It is not necessary to take up any more time in discussing this phase of the question. I have been in a few of these meetings and have found that the most profitable part of the meetings is what comes out in the discussion, and if I have not made myself plain along this line I am here to answer any questions or explain any subject that I have not fully covered.

In maintaining the fertility of the orchard, as I said at the outset, we must plan to conserve this fertility for at least seventy-five to one hundred twenty-five years.

You men who are growing peaches do not come in this class at all; we who are growing apples must provide for the longer term of

years and we must, for this reason, conserve the fertility of the soil. We can burn it up but this is not what we should do if we want to get out of the soil, in our trees, the profits we should have for our labor.

DISCUSSION.

Mr. Bassett—Will you please state your varieties?

Mr. Hall—This orchard I speak of is Northern Spies and I will say that it is nearly the only apple I know anything about, and I wish I had never known any other apple than the Northern Spy. It is good enough for me.

A Member—Over how much space do your trees shade the ground?

Mr. Hall—Our trees are set forty feet apart and they are twenty-one years old, and they have just begun closing up the angles. They cover at the present time about twenty-five feet to each tree. However, we have some trees that my father set in the old orchard that I think have a breadth of fifty feet. I have taken from one of these trees this year fifty-five bushels of apples, and the limbs were not broken down.

The Chairman—According to the program, Mr. E. J. Overton of Bangor is to lead in the discussion of this question, and, after he is through, then you may fire in as many questions as you wish and they will no doubt take care of them for you in a satisfactory manner.

Mr. Overton—Mr. President, Ladies and Gentlemen—The cover crop is undoubtedly one of our best means of feeding the apple orchard. Nature abhors barrenness and makes every effort to cover up the bare spots; so I am in favor of the cover crop to this extent that I would cover all the ground all the while with as dense and compact a covering as I could produce; and in my estimation there is no cover that is better than June grass and with plenty of mulch around the trees. Sixteen years ago I planted an apple orchard on the intensive plan. This orchard was planted on a clover sod, turned under the previous year. The trees were set twenty feet apart for a permanent orchard and crops were grown among these trees for three years. Then it was seeded down to clover with a mixture of Alsike and timothy. The seeding was done in the spring of 1899. I got a very good growth the first year, which was cut and left upon the ground around the trees. The next year we had a very fine growth of clover, around two tons to the acre. This was also left upon the ground and part put around the trees as mulch. After that the timothy was more in evidence which made a very vigorous growth from the feeding of the previous crops that had gone back to the soil. The result of this method, the sod mulch method, was a uniform growth of trees, very hardy, came into bearing young, and have borne continuously. This orchard commenced bearing at ten years of age and it has been an annual bearer ever since.

I am very much encouraged with the future prospects of the apple industry. I believe, yes, I know, there is success for those who are planting and growing orchards in Michigan; for they are building not only for themselves, but for generations to come.

A Member: Don't you break up that sod at any time?

Mr. Overton—It has not been broken for thirteen years.

A Member—What kind of soil is this?

Mr. Overton—Clay sub-soil; a part on heavy clay soil, sandy loam with clay sub-soil.

A Member—Have you suffered any from drouth?

Mr. Overton—To no extent.

A Member—What varieties do you have?

Mr. Overton—Johnithans; Dutchess and Oldenburg.

A Member—Are all of these trees twenty feet apart?

Mr. Overton—Yes, sir.

A Member—Are your Johnithans large and marketable?

Mr. Overton—Yes, sir.

A Member—What did you do with the tops of the trees that are twenty feet apart?

Mr. Overton—When I planted this orchard I planted it with the idea that to succeed I must know not only how to conserve the fertility of the soil, but also the growth of the trees. I have done this by annually heading-in and heading-back as they came into this allotted space that had been given to them and they are not crowding any today. They filled the space five years ago and they are no larger today than when they came into that space which was allotted to them. It is my intention to hold this orchard where it is, a semi-dwarfed orchard made so by annually trimming it.

A Member—When do you do this?

Mr. Overton—In the fall and winter; at any leisure time I have before the growth starts out in the spring.

A Member—How much do these trees bear?

Mr. Overton—Three barrels to the tree.

A Member—What did you say the age of them was?

Mr. Overton—Sixteen years.

A Member—How many acres do you have?

Mr. Overton—Five acres.

Mr. Wilson—I would like to ask if you thin out your trees so as to let the sunlight get in?

Mr. Overton—Yes, sir; and I may say that under the Sod Mulch System, we are not growing as much wood as we were under cultivation, but we are getting the fruit, the quantity, the quality and the color.

A Member—That's good enough. How much alfalfa do you use?

Mr. Overton—I do not know about that. I cannot say for certain.

Mr. Wilson—I just want to say a word about this alfalfa business. I seeded down a little orchard that I have of Ben Davis and some other varieties. A year ago last spring I got bacteria from the college, and there was a good growth of mammoth clover, but among the mammoth clover there must have been a few seeds of alfalfa. This had been growing for some time until this year when we started in plowing it up and we found roots of the alfalfa as big as your wrist that would turn a plow out of the ground. I had read of roots of alfalfa going down 137 feet to the coal mines for moisture and so my boy, who did the plowing, thought he would dig down and see how far those roots extended downward. He dug down for three feet and the root remained the same size. Then there were two roots, double the

size of my finger that branched off and he continued on digging for six feet, when pulling them too hard, he broke them off and they were still practically the same size. I do not know how much farther they went down into the ground. I have thought it would be a great feat if we could in some way graft the roots of our apple trees onto alfalfa roots and these would go down to the moisture, no matter how far it was below the surface, and then there would be no danger whatever from drouth. (Laughter.)

A Member—Michigan is a great state. Now this gentleman (Mr. Overton) is from Bangor. I am from Traverse City. His method may be all right for his section of the state, but it would prove an absolute failure in Grand Traverse county.

Mr. Wilde—It is our sub-soil that will tell whether it is right or wrong. On our sub-soil I don't think we could get size in a dry season on account of the fact that the ground is of a rolling and stiff clay. With stiff clay there is nothing to hold the moisture up and for that reason we have to conserve what moisture we have. I have seeded it down once or twice and, with me, the results were not what I would like, but I believe that these men are right—on some soils you have enough moisture while on others you do not. We have always practiced clean culture for apples, and sometimes for peaches, then we sow cover crops, oats and vetch—sowed about the first of August and then plow the vetch under, which we do with a gang-plow, soon enough so that it can be done without difficulty. If left too long, the ground will be hard to plow. We sow only about ten pounds of vetch to the acre. It has been twenty-five years since I planted the orchard, but we have had good results. We get size, but not always the color but, as the orchard becomes older, we are getting more color. I don't know as I am doing the best thing, but I believe that our treatment must depend upon our subsoil, for we cannot treat all sub-soils alike and get the same results.

Mr. Hall—This proposition is one that every person must work out for himself. There is a vast difference in Michigan soils. When you plant out trees it is not like taking a cow to pasture—if the pasture is not right she can move, but it is not so with your orchard. So it is up to the individual grower, under his own conditions, to study out the method that will produce the best results, and it often happens that each tree in an orchard may need different management. We have found this to be the case in our own experience. We have had trees growing fruit that are too corky—the fruit too soft. We suspicion that this is because they are getting too much nitrogen, so we must add phosphoric acid and potash, and the best method to apply this is wood-ashes. However, of late years wood-ashes is not very much in evidence and not very available. Where this is the case, we must use commercial fertilizers. With us, we do not make a point of putting out and spreading so much to the acre over the whole orchard, but we study each tree, and if it is growing fruit lacking in color, large and spongy, it is an evidence that it needs phosphoric acid and potash, and so we feed each individual tree to meet its requirements. We are working along on this line, with a view of securing a uniform growth of fruit under the variety and condition of soils, and it seems to us as the years go

by that we are making some progress, but I wish to emphasize again that each individual should study his own conditions."

"Now let me illustrate what I mean: Here I hold in my hand this fine large specimen; what is the matter with it? You say it is overgrown, and that means that if you should cut into it you would find it was spongy. Now here is another apple even more pronounced in this respect, you do not want to raise that kind of apples so you must take steps to have your trees yield a different type of fruit, but here is another—one of the same variety—that is in ideal condition—right size, high color, free from blemishes and would be in demand in any market. Now, this is what we are trying to work for. These two types of apples were grown in the same orchard two rows apart; the tree from which this apple (exhibiting specimen) was grown is getting an excess of phosphoric acid and potash, or a minimum amount of nitrogen, while this specimen shows that the tree is receiving the opposite, so you see that in this orcharding proposition every grower must be a careful student of his individual conditions, and in time I am satisfied that every true apple grower will be able to solve these problems that confront him under his conditions, to his satisfaction."

A Member: "I have had an idea that we might feed color into the apples and have tried phosphoric acid and potash in about 400 pounds to the acre, and use bone meal at the rate of 1,000 pounds, but in three years we have not received satisfactory results; perhaps it takes even more time to get good results, I do not know as for that."

A Member—"What kind of soil do you have?"

Answer—"Clay loam, the clay is quite thick, dry in dry seasons, but we have not been troubled any with dry weather during the past two years. Either our trees have a full meal and are not taking in any bone meal, or the bone meal was not good—though, I do not think this could be the case, as we procured it at the Agricultural College, and it must be all right. I think there must be some other reason. I know on a lighter soil one gets results from manure quicker than on clay soil, this is our experience, and we are feeding ten acres out of forty."

Mr. Overton—"There is an idea that I am working out in connection with the feeding of an orchard and that is to lessen tree competition as much as possible for food and moisture. This is done by interspersing the summer varieties among the winter. For instance, the Duchess is interspersing among my winter varieties. Their demands upon the soil are early in the season. And their work is completed before the winter varieties make their demands upon the soil. I am quite sure that this is an important point that will be worked out in the future and especially where there is close planting of trees. I have but little use for second grade apples and I think that this grade can be almost wholly done away with through proper effort."

A Member—"When we have one limb that will grow these spongy apples one year and small ones the next and vice versa, what are we to do?"

Mr. Hall—"I have known these conditions; and I will go still further and say that while my orchard was growing up I was running a saw-mill and had an abundance of wood-ashes. I set my teamster to

hauling out these wood-ashes to the trees, and so liberal was he in his use of them, that out of the seventeen rows he covered only six, but these six rows have produced more apples in this orchard under equal conditions—no difference in soil—more fruit and better fruit in the last seven years than the other eleven. I will say this for wood-ashes—we did not get results, as Mr. Wilde says on the spur of the moment as when we applied it to annual crops, but wood-ashes that I applied have been worth—I would not undertake to say how much as I said before, the six rows are much more valuable than the other eleven. This is a proposition, as I said before that every person should work out under his own conditions.

A Member—How do you apply the wood-ashes?

Answer—In this case they were fed over the whole ground twelve years ago, care being taken not to get them up against the body of the tree.

A Member—Which apple do you think brings the best price in the market, the small one, large or medium?

Mr. Hall—I think the medium apple has the most ready sale.

A Member—Have you ever had buyers kick on their being too large?

Mr. Hall—Yes, I have.

A Member—Don't you think the different sizes of the trees have something to do with the limbs and the nourishment that come from the trees?

Mr. Hall—We see these conditions on individual trees. One side of the tree is out-growing the other and needs attention to keep it well balanced. This must be attended to with the pruning shears, in such cases too much sap goes to one side while the other side is being robbed. It is hard to overcome this and cannot well be done this year, but next year by eliminating the strong growth, there can be a balancing up of the tree so that it will produce all right.

I have a case in point. In an early day a log house was built upon one corner of this orchard which later was burned down, the ashes of which were left on the ground; later on the orchard was planted, one tree near the location of the old house. One side of this tree is feeding from this soil impregnated with ashes while the other side is feeding from soil in a normal condition. So pronounced is the difference in the fruit upon the two sides of this tree that I have had many very heated arguments with buyers, they believing the tree is from two separate grafts.

A Member—I would like to have an answer to question No. 33: "How can we get higher color in our fruit?"

Prof. Eustace—This is a very important question just now when you are coming in competition with western fruit which has that high color. To my mind, it is a little doubtful whether we can in the East secure color so as to compete with that secured on the western fruit. You understand that the apples grown in the Hood River and Yakima valleys and other sections of the West are in the sunshine from the time the trees are in bloom until the fruit is ready to be picked, except at night. We must grow apples that are of fine color if we are to compete with them on this point. How can we do it? I have seen attempts made, careful experiments, endeavoring to put the red color on

the apples by feeding the tree salts of iron and large amounts of wood-ashes and other chemicals, but I have not seen any of them that are entirely satisfactory, so I have almost come to the conclusion that you cannot get the color on the apple in that way. But I believe you can get it with a sod mulch and enough sun. There have been very careful experiments made in New York where one-half of the orchard was cultivated for a series of years with clean cultivation while the other was in sod and there was a very marked difference. The apples grown on the sod would have better flavor and a richer color than the other, which might possibly be due to the fact that the apples matured earlier on the sod than on the other, and early maturity brings color.

Another thing is thinning, pruning and doing anything to open up the tree so that the sunlight will get in. After this is done, then the cold nights will do much. In parts of New York and Michigan, where they have cool nights and the winter apples are out, they color up very fast. In high latitudes, they have a much better color than in lower. In the northern part of this state, the Mackintosh, Snow and other apples like that take on a beautiful color; more so than in the southern part of the state.

You ask about pruning. Prune the trees so they can get a large amount of sun-light. Thin the fruit and that will help. Undoubtedly, large amounts of wood ashes will have a desirable effect. Michigan apple growers must get that color. The western fellows have it, but it comes because of the perpetual sunshine they have.

Mr. Wilde—These heavy cold soils, deficient in lime do not produce the fruit with color that these warm, limestone regions do. I have never seen a case where the soil was deficient in lime has produced highly colored fruit, and I am not familiar with any case where specially large quantities of lime have been added to bring about this change, so I can not say whether it will give the desired results or not.

Question 26—How many have had profitable results from the use of commercial fertilizers? Can we afford to buy stockyard manure?

A Member—We have been conducting experiments on the Dutchess apple and failed to get very satisfactory results. We use a complete fertilizer—potash and phosphate—phosphoric acid and nitrogen.

Question—Is your soil not naturally rich?

Answer—Yes, it is.

Member—Then it did not need it.

A member—We have been using potash, phosphate and bone with good results, and are well pleased with it, and we have thought we secured a good deal of color out of commercial fertilizers. I know we have on the peach, and I think we have on the apple also.

Mr. Wilde—We have had results on plums and peaches, but what about apples? Apples do not seem to respond.

Mr. Bassett—Our experience proves that there is just one way to get color, and there is no other system by which you will get that apple to take on the right color except to get it under the sun's rays—then you will get some color, but you can not get it by putting on phosphoric acid, potash, etc. If that apple is hid away from the sun, there is no way to get the requisite color except by getting it exposed to the sun by cutting away the branches so there is not so much shade. This is the gospel truth.



Duchess of Oldenburg orchard, 1,600 trees twelve years old, owned by Geo. M. Low Co., near Bangor.



Benton Gebhardt of Hart in cherry harvest. Notice sheet on ground to catch the clipped cherries.



A Member—What is in the rind of that apple there before us that makes it so dark, and this apple so much lighter. Has that ever been answered?

Answer—This is because of the different characteristics of the apple.

A Member—Then is it the sunshine that does it—that puts the rind on the apple?

Mr. Bassett—It is because of the pigment which responds to the coloring. The apple is white because there is an absence of pigment.

Prof. Eustace—A part of it will come from sunshine, and another part from some source which has not yet been discovered. You take an apple tree that is growing on poor soil, but where the sun has kissed that apple, and you get that color. A tree growing on a cold clay soil, you do not get the same color you do where the same tree is growing on a warm limestone soil—you get a good deal better color in the latter case. Sometimes the difference is so marked that it is difficult to identify them. Then if you put a bag over some of these apples, they will be grayish green. Just how much on one and how much on the other is due to sunshine or the other elements, I do not know.

A Member—Why will grass grow bristles on a hog and wool on the back of a sheep? I think the same thing applies in the case of the apple.

Mr. Hall—There is a great difference in the pulp?

A Member—Does the color of the pulp make a difference in the color of the skin?

Prof. Eustace—Take this Northern Spy that is well colored; let the chemist analyze it, then another apple grown on the same tree of a grayish green—there is a decided difference in the taste. I have some students right now working right along that line, and they find that they are able often to detect the difference in the taste and tell the color of the skin from the taste alone.

A Member—Then does not the degree of ripeness have something to do with it?

Prof. Eustace: At the Geneva Station they have been carrying on an experiment of determining the flavor of apples on cultivated soil and on sod, and I am sure that you would all say that the apples from the trees on the cultivated part was much finer in texture and more tasty than those grown on the sod. It was my job to inspect these apples in cold storage for the Government, and I noticed this, and remarked upon it, and then I tried it on every man around the place—I said, "You eat this apple, and this, and tell me if you can distinguish any difference," and in every case they could tell the difference.

A Member—Was the lightest colored apple the best?

Prof. Eustace—The apples on the sod were the highest colored. The point may be, these apples were possibly over-ripe—they may have passed that point when they were not at the best in their life history. Some varieties of apples, when their chemical and physical properties are just right are better than at any other time.

A Member—Overloading of the trees may take the flavor out of the apples?

Prof. Eustace—I would not wonder but that would have such an effect.

A Member—Does the color have anything to do with the value of the Greening? The Judge gave the first prize to the apples that had a red tinge on every apple. Was that right? The fact is that the Judge was severely criticised? Did he do the right thing?

Answer—My opinion is that he did right.

GRAPE TROUBLES AND THEIR REMEDY.

R. A. SMYTHE, BENTON HARBOR.

The subject assigned to me is "Grape Troubles and Their Remedy."

In looking over the matter I think the excess of moisture has been the cause of much of the trouble we have had. The three troubles which has been given us the most concern in the way of pests are: Black rot, brown rot and downy mildew. The latter we are not troubled with, but the excess of moisture we have had during the last two years is responsible for the others more than anything else.

In Berrien county we have lost hundreds of acres of grapes during the past season—they would not ripen on the vines; and then the prices were so low that it was not worth while to pick them and many are seriously considering the idea of taking out their vineyards and engaging in some other line.

But when we come to look at the matter we find that the grape area is not very large in the United States comparatively speaking, and the consumption of grapes is increasing all the while, but the whole difficulty, it seems to me, lies in the inadequate distribution of the product.

The black and brown rot are controllable with the spray, provided the work is done thoroughly, and at the right time. In our own, and in the Lawton district, where they have had considerable of the black rot, we have sprayed and have been able to secure a fairly good crop, but in other places where they did not spray, the crop was lost.

If we want the spray to be effectual, so that we may raise good grapes, four sprays are necessary. This is our own, as well as the experience of others. First for the dormant spray, use 3 pounds of copper sulphate to 50 gallons of water and this should be applied before any leaves have started at all. After pruning apply another spray—4-4-50 with two or three pounds of arsenate of lead just before the grape blooms, then another spray after the berries are formed and the leaves are out, 4-4-50. If the vines have been injured the previous year, a fourth spray is necessary and there are some who spray 5 times.

The disease in grapes are something like the San Jose scale. They come upon us almost before we are aware of them and require the utmost diligence to successfully combat and eradicate. Sometimes it seems like a question of the survival of the fittest, and yet they are not wholly unmixed evils. Sometimes I think they are "angels in disguise" and the grower who fights to raise good fruit will in the end surely get good prices. These experiences are putting the men out of business who are doing their work indifferently. Apple men have discovered that

unless they keep their trees in good condition they had better get out of the business. We have some of these in our locality and they are injuring our business.

The grapes do not have so very many serious insect pests that attack them, and yet these pests seem to be increasing every year. I just recently heard of a new insect pest here in Michigan—the root worm. Mr. Scott, of Washington, who has been conducting an experimental station at Benton Harbor, has discovered them, but they have not as yet got into our locality. We cannot, however, tell how long it will be before they will be with us. It is not an insect that can be controlled by spray, as it works at the root and goes through the cane.

A gentleman in Pennsylvania told me the only safe way to control it was to keep the ground cultivated thoroughly, so that the worm may be exposed to the air, in which case an exposure of half an hour to the air and sunshine will kill it. The Experimental Station at Washington has given much time and thought to this insect, and so far has discovered nothing in the way of a spray that will control it. The spray might help to kill its posterity; so if you have any difficulty, look out for this worm, for it increases very rapidly. I hope we will not be troubled with it, as it causes great damage.

The berry moth has been quite troublesome in some localities, is controllable with the spray. All trash, leaves, and stuff of that kind should be kept out the vineyard, and in this way insects of this sort will be destroyed.

The rose bug is another pest that in some localities is quite troublesome, especially in the St. Joe River district, and there is nothing to control it. The best thing is hand picking, but in a large vineyard this makes it quite a serious problem.

The Michigan Experiment Bulletin No. 3 of 1909 is a report of some very interesting experiments on the subject of grape culture and the control of pests, and especially the Michigan special bulletin No. 49 of 1909; then also the department circular No. 65, of 1909, by Mr. Hawkins, who was here at the summer meeting two years ago, is very interesting and valuable. He has made most extensive experiments in grape troubles, and his work is very valuable.

As I said before, the most of these difficulties can be controlled by the spray. It has been found, however, that lime-sulphur is of no value whatever.

I do not think that Berrien county will be found wanting another year. We have outside of Van Buren county the largest acreage of grapes in Michigan. Last year from Benton Harbor, and vicinity there were 3,000 cars of grapes sent out.

Bad as are the various pests, and new ones coming right along, yet they have not been the most serious menace to the grape growing industry during the last year or so. There is one trouble that handicaps more than these, and that is the question of marketing. Here is where we experience our most serious trouble. The prices last year were so low—through the association bringing only 6½ cents—that when I got through I concluded I had not made anything. If we are going to stay in the grape business we have got to wake up and provide some way to

get our grapes on the market in better condition, so we can receive some sort of a compensation for our work. Our growers can produce good fruit, but for some reason they cannot sell it. What is the trouble? Where is the difficulty? I am glad that Mr. Thompson will be here; for I have heard much of the results of the co-operation they are carrying forward over in Canada. I am satisfied that we will never get the prices we should for our fruit so long as we let it go through the hands of several middle men.

We have this year had several associations in the vicinity of Benton Harbor. Some of our growers got as high as 7 or 8 cents while we sold for $6\frac{1}{2}$ c, and some received as low as 5 cents.

I figured that the grapes would cost me 6 cents to put on the markets, and $\frac{1}{2}$ cent for 8 pounds of grapes is not a very large profit. Indeed it does not pay. And when they went lower I stopped picking.

While we have had much to discourage us in the grape industry during the past two years, yet I do not feel that I want to go out of the business; for this is a great country and there is a great demand for grapes, and in places excellent prices are being realized. What we want is to put our grapes on these markets and then we will get something like what they are worth. I wrote to a brother in Kansas while we were selling our grapes for $6\frac{1}{2}$ cents, and he was paying 35 cents for the same thing. Just the other day in St. Joe a man wanted two cars of grapes and he said to a broker, "I will give you 10 cents a basket, if you will go and buy me two cars." The broker went out, and bought them for $6\frac{1}{2}$ cents, and then turned around and sold them to the other man for 10 cents, making as you see, a neat little profit for his two carloads. And the next man who bought them from the second man paid him 15 cents. This shows that there is a big gap between buyer No. 3 and buyer No. 1, so until we get busy, or until we get together on some basis of co-operation, I am afraid that there will be little or nothing done.

And it is just as true of apples and other fruit as it is of grapes. The distribution problem is about the most serious problem that confronts the grape as well as the apple grower now. Unless we can find markets where apples and grapes are not grown, and get them where there is a demand for them, we will experience a continuation of the same difficulty; but when we can overcome this, then the future of horticulture is assured. This year has shown that this is true in many lines, especially in peaches but perhaps not so much as in apples.

Several organizations are trying to help us along but I am a little wary. I believe if we go at the matter right, and there is an unselfish effort put forth to carry forward the work on a business basis and with the elimination of personalities it will win out all right. A few years ago the Western farmers did this with grains. Why cannot we do the same thing with fruit? We have been talking about doing something for a long time, and I think it is about time that we did something. We find men with 10 or 20 acres who are having even a harder time than those who have a larger acreage. I should like to hear from others on the subject and, as there is said to be wisdom in a multitude of counsellors, I feel sure we can get at some plan or work out some scheme whereby we will be able to win out all right.

Mr. Wilson—What do you think of the idea of growing just enough grapes to supply the demand as is done with many staple products which are controlled by the trusts?

Chairman—Mr. Friday is on the program to discuss this paper and he will now have the time, after which you are at liberty to fire in just as many questions as you want to.

Mr. Friday—There are many things necessary in the successful growing of grapes. First of all the fruit must be grown, but, even after it is grown, there is another thing that the majority of growers don't know how to do, and that is to pack it as it should be. This year the grapes were not very plentiful and they sold at ruinously low prices, and the real reason for this is the fact that the fruit was not packed as it should have been. Mr. Smythe said in substance that the farmers took what was thrown at them. A good many farmers should have had bricks thrown at them. Their grapes were not sprayed and the quality was not there, and these went on to the market, and of course could not receive anything like first class prices. There were carloads of grapes shipped that were not even blue—just red. They had downy mildew and other diseases. We cannot put that trash on the market and expect to get anything in return for it. We must raise grapes that are grapes.

A great deal was said about co-operation, but I want to say that there is no way of co-operation when growers are so careless. The thing that must be done before any success will come through our organization is to grow the grapes that we can sell, and we will never make anything by selling them on the margin of a half-cent commission. There must be some standard maintained. In some places this is done. Every grape that goes into a basket should be as demanded in some organizations; a bunch of grapes without any black rot or any blemishes, each bunch at least three inches long, and the grapes should be wilted before being covered, so that the weight will be there and at the same time the cover will not have to be jammed down on the fruit so as to crush it.

Again I want to emphasize the fact that we must deliver the goods. One man from one of the associations bought over 125 cars of grapes and he made only one dollar on some of these cars of grapes. A number of cars were turned down because they were so poor. As long as the grape growers will abide by this system of raising and delivering such fruit they are right in line with being wiped off the earth. Many of these grapes were only vinegar grapes, not even wine grapes, and although the seller may dispose of a few car-loads of them to one man, he cannot sell a second car nor keep it up when the quality is not there.

It is not a question of ignorance. We know how to get the quality and this is what must be had, and it must be had not only by one or two farmers, but by everyone. There must be co-operation all along the line. The grape vine, even though it does not have downy mildew or is not infested by other pests, does not grow as good grapes without being sprayed as when it is sprayed. A basket of grapes from well sprayed vines will always carry better than those unsprayed, even though they are not directly attacked by pests. I am told that the men who went into the association they had in Van Buren county, where

they did things right, got at least ten cents for their grapes and they started out at twelve cents. There were many at Benton Harbor who sold their grapes for five cents, but even that was more than they were worth. Two cars that I heard of went to Minneapolis, and were there condemned and sold out and made into vinegar. I think we will get money out of our grapes as soon as the grapes are delivered in the right way; but I don't believe we will ever realize what we should until this phase of the subject receives more serious consideration.

DISCUSSION.

A Member—I think the grape grower is making all his own troubles, at least to a large extent.

A Member—I realize that we must do something. Apples are cheap and yet within fifty miles of where I live they do not have any apples at all, and are willing to pay good prices for right fruit. My apples have gone all right; they were sold out in little towns and I believe that there are hundreds of little towns that would take every apple raised in the State of Michigan, if they could be given a chance to get them. The trouble is, we rush everything on to the big markets and by so doing, they are glutted; and small fruits especially, being of a perishable nature, have to be disposed of at great sacrifice, or lost altogether.

A Member—I would not take it that Mr. Friday is opposed to organization, but that he does not consider the grape growers' association up to the standard for the business. I am sure that the principle is right, but his complaint is that it is poorly carried out. Everybody is saying that something must be done and no one seems to feel competent to tell just what that something is. It is hoped that we may here formulate some plan or make some recommendations or take some action whereby we will go on record in such a way that something will be done when we get back to our homes. The trouble with so many of us is that while the "spirit is willing, the flesh is weak." We are not willing to put our hands into our pockets and back our plans with our money. We must put our money up. It is a question of "put up, or keep still." We cannot get out with one-half cent brokerage and agents' agreement. But an association backed up properly will do something, and the longer we put it off, the further away will be the desired results.

Mr. Friday—I am not opposed to the association or the association idea when properly controlled, but what I do object to is an association controlled by one man for his own use.

A Visitor—Gentlemen and Ladies: When working men are paying all their wages for the necessities of life, they are not going to buy many luxuries. The average wage earner, when he must take all his earnings to buy bread and the necessities of life, will not stop to take baskets of grapes home. The cost of living of the average wage earner, with a family, necessitates a degree of economy that forbids spending very much for luxuries; and it is for this reason that so little fruit is found on their tables. Why! your sugar should be sold for 25 to 30 pounds for \$1.00 instead of 15 pounds as it is now. Whenever you wake up to

these things and provide some adjustment of them, then people will use fruit. Fruit is a luxury; apples and peaches are luxuries, and the people of the United States are not able to buy luxuries. Whenever the living can be reduced, there will be no trouble about your fruit having a good sale. I am from the Pacific Coast, that great fruit growing country, and I know that the apple-men of Oregon are shipping carloads of their fruit eastward, running it right through your own district here in ice cars, in order to supply the English and European markets with a very inferior apple. I defy any woman to make a good dish of apple sauce out of an Oregon Northern Spy, or Greening apple, or to make a pie fit to eat. Now all this is done while you here are in shape to almost float your apples right on to these markets without a tithe of the expense. Michigan apple growers, you ought to wake up to the fact that you are here with gold mines on every farm, if you only understand it.

A Voice—That's right.

Mr. Young—It seems to me that all this talk will amount to nothing unless we take some action that will mean something. I therefore move that a committee of five be appointed to formulate plans for a permanent organization to market our fruit, and submit same to this convention at some time later in the sitting. This motion was seconded and carried.

A Member—I would like to ask if this organization is to be of a local or a general nature.

The Chairman—Undoubtedly the committee will make suggestions along this line.

A Member—Is this for general fruit, or for one particular kind?

Answer—It would be of a general nature.

On motion the meeting was adjourned.

Chairman—There are two more numbers on this program and I think we had better have them before we admit of questions being asked. We will now hear from Hon. R. H. Graham, of Grand Rapids, on the subject of "Preparing the Land and Planting."

PREPARING THE LAND AND PLANTING.

HON. R. H. GRAHAM, GRAND RAPIDS.

Mr. Chairman, Ladies and Gentlemen: I feel as though I should offer an apology to you for not being here on time, but I was unavoidably detained. I was, also, sorry that I did not hear Prof. Eustace, in his talk in selecting a site for an orchard. I imagine that there is not so very much that needs to be said, but I will consider the topic briefly.

The question of selecting a site is far more important than preparing the land. To begin with, it makes a vast difference what kind of land you are going to prepare; what the previous condition of the land may have been; how it had been handled; state of fertility, etc.

In a general way, however, I would not advocate planting young

trees on sod land or land that had been in sod the previous year. As a rule, it is a great deal better to have, if one can, a corn crop or potato crop off the land the year previous to setting out the orchard. If it is sandy land with a light surface or sub-soil, no further preparation is needed except to fertilize it, and perhaps not much of that. It is not a good idea to have land too well fertilized for planting young orchards. As a rule, with good cultivation, we get a sufficient growth the first year without very much fertilizer. If the land is in sod and the sod is plowed under, the trees will make too much growth the first year, growing too late in the fall, and because of this will be liable to winter kill. Young trees of all kinds this year, that were planted on good land, so far as my observation goes are still very green and very soft and not in good shape to go through the winter. It has been my practice, wherever possible to plow, if the land was in corn or potatoes the previous year, to fall plow and plow pretty deep. Then, plow again in the spring, using perhaps a little fertilizer, but not very much.

I have never practiced dynamiting for planting trees, as I do not know enough about it. I do not believe in digging holes for young trees, especially if you have a clay sub-soil. In other words, I would prepare the land so that the entire land as a whole is of a sufficient depth. We can very readily plow eight or ten inches with any ordinary kind of land and that is deep enough for orchard planting. It has been our practice in planting, to mark out our land as we would for corn. If the trees are to be planted sixteen feet, get on every fourth row, and so on. It has been my practice also, to plant regular distances; that is, sixteen feet or twenty feet, or twenty-four feet, or twenty-eight feet, or thirty-two feet; so that in rowing the crops, the intervening crops, we have our rowing four feet apart, for the rows, if different crops are to be planted in them. It saves a great deal of trouble. The object of marking with a corn marker instead of lining out, is for convenience. In after-cultivation you will not be bothered by having a wide space and then a narrower space. I remember the very first orchard I ever planted. I lined it up and plowed furrows into which to plant the trees but, instead of marking it, I measured it up and followed down and all through that orchard every other space or row was wider than the other. We line up and mark out, getting them as straight as we can, just as you would a corn field—marking both ways. Then, with a good big turning-plow, plowed the furrow of every fourth row. If you are planting sixteen feet, plant on the line the other way, planting cross-wise of the furrow. There is nothing scientific about that, but when you get your orchard planted, you will have a very uniform and straight lot of rows, more so than by any other way that I know of and it will be done with much less expense, in one-fourth of the time and give you a better job. After you have set the rows in this way, there may possibly be some trees a little off the line. If so, then look over every row and have any tree that is not set as it should be, straightened up. You will, in this way, get your orchard out with less exertion, trouble and expense than in any other way. You cannot do that on sod ground. There are no holes to dig. The big furrow is hole enough to set the tree in. Of course, these trees are one

or two year old peach, plum or apple. In this way, we get our orchard planted with the minimum of expense and maximum of results.

(A Voice—I suppose that means pruned!)

Every tree should be root-pruned. I like to prune from the bottom of the root and not from the top. I like to use a knife and not a pair of shears. Wherever the root is cut it puts out a lot of new roots. If we were to take up a tree which had been planted for several months it would be found to have put out a bunch of new rootlets. If the roots are cut from the bottom the new roots will start from the bottom and grow down. If they are cut from the top they are on the surface where it is liable to be dry and instead of being where they can have moisture and go down in the earth, they are liable to dry up. Every mutilated and broken root should be removed or cut back to the injury. Top-prune the trees after they are planted and not before. We can do a much better job after the trees are planted than before and with not very much more work—indeed not any more. You have the tree standing in the place in which is going to stand and you can trim it accordingly. In planting a peach that has been budded I always put the buds all one way. Where they start out there is a curve and put that curve so that the top will point to the west, that will make it look nicer, more uniform. That does not hold true of apple trees and some other trees but it does of the peach. If the trees are not too large, in planting the peach we trim to a switch and then cut the switch off. If very large trees it is not always safe to do that because they may not grow, without spurs left on the branches leaving a bud on the branch so that they will start from there.

If the trees are large, leave some spurs with buds; if small, cut to a switch and then cut it off. We grow our trees too high as a rule. I had rather have trees two feet instead of three. What I have said applies more particularly to the peach. Apple, pear, plum and cherry, we do not cut back to the switch, but leave eight inches of the top on the tree. Where we get one-year sprouts we can work it differently. We can trim to a switch; but on ordinary two-year old nursery stock, we must leave some of the old top on. Of course, what I have been saying here is mere A B C of tree planting and is doubtless of the slightest interest to those who are in the habit of growing trees, because you know all about it. It was supposed that this talk was for the beginner, and I have been talking with that idea in view.

When you get the trees planted, they should be cultivated very thoroughly up to the first of August. I like a corn crop in a young orchard the best of any crop I know of. It protects them from strong winds and does not take from the soil. Potatoes would be the last thing I would grow in a young orchard.

A Member—"Do you have an novel way of draining the land?"

Answer—"Ordinarily we would not plant on land that needed much draining. I do not know of any way to prepare wet pieces of land for an orchard. Possibly it can be done, but I do not know just how. The only method of draining an orchard is by under draining. Sometimes we have an orchard that is a little wet in one corner and we take chances on that and put in tiles. However, about the only way is to take a team and scraper and fill up these low places. I have never

been very successful in tiling orchard land for the tile will soon fill up with roots making them unsatisfactory.

Question—"Give us your method of putting in tile."

Answer—I have been putting in tile this summer—put in two miles of it. I looked up the scientific method of leveling when I started out, and it seemed to me that it was awfully cumbersome, surveying, etc. So I began thinking about the matter and worked out a scheme of my own and it is perfectly satisfactory. The first thing I determined was which way the water would run. That was not very much trouble this year. Then I went at it and dug the ditches, but instead of having instruments and running a lot of lines and doing a lot of measuring, I took a 10-inch board 10 feet long, nailed a strip from each end so as to form a triangle then I drove a nail for the plumb-bob, where the two pieces meet and then set that triangle on the floor that I knew was absolutely level. I used that for leveling all of my ditches. It was the handiest thing imaginable. It showed any inequalities in the ditch for, if the little weight hung just one side of the mark, there was a little fall to the ditch. We did not have to do any surveying and the work was all done with this home-made device and the tile are working fine.

A Member—I would like to have the answer to question 23 given: "How deep and how far apart should under-drains be placed in sandy, gravelly and clay soil intended for orchard planting?"

Answer—This I think was answered when it was stated that in planting an orchard, ground should be selected that did not have to be drained.

Chairman—Question 18 is called for: "What nursery stock can be successfully set out in the fall?"

A Member—We set out sweet cherry in the fall and like it better than setting out in the spring.

SPRAYING AND PREPARING FOR WINTER.

PROF. C. P. HALLIGAN, EAST LANSING.

Mr. President, Ladies and Gentlemen: I understand from this question of "spraying and winter protection" to be applied more especially to a young orchard, and so I feel that there is not so very much to say. Perhaps that is why the topic was assigned to me.

I am glad, however, to have the opportunity of being here, and of saying a few words about spraying a young orchard, not only for the benefit of beginners, but for fruit growers, even those who claim to be progressive so far as spraying is concerned, but who often neglect the young orchards at spraying time, although they carefully spray their older orchards.

I do not believe that a fruit grower can afford to neglect spraying his young orchard. It certainly is not economy. I look at the proposition like this: The first few years in the life of an orchard we are

growing trees. When the tree comes into bearing it does not depend upon the age of that tree as to the crop it produces, but more upon the fruit-bearing surface of that tree, and as far as the young orchard is concerned when it comes into bearing the production of the orchard does not depend upon the age or upon the number of trees, but upon the fruit bearing surface of that orchard. So everything should be done in the early life of the orchard to promote a strong, vigorous growth, so as to have as large a fruit-bearing surface as possible when the trees come into bearing. How common it is to see in this State our young cherry orchards defoliated by leaf spot and peaches by leaf curl and even on some of our best fruit farms we often find excellent young orchards defoliated in the middle of the summer through neglect of spraying. It means that these trees were stunted and only made half a growth. If such a condition happens, precedes a hard winter then they are more subject to winter kill.

During the early years of an orchard it is not necessary to spray as frequently as it is a bearing orchard, because with a young orchard we are protecting the growth of the branches and foilage, whereas with the old orchard we are protecting the foliage and the fruit. Where one or two sprays may be necessary therefore in the new orchard, it may take four or five sprayings to meet the requirements in an old orchard. The whole aim of the grower is to promote a healthy growth of the trees. We may have a good site, good soil, practice good cultivation and fertilization—we may have all the conditions present for a strong and healthy growth,—we will then get a good tree provided it is not injured by some fungus or disease. I do not want to belittle the importance of cultivation—cultivation of a good strong, healthy tree is a preventive against disease. A healthy tree is not as susceptible to most diseases as a weak tree. At the same time, given all these conditions, there are many of the diseases that will strike a strong tree as well as a weak one, so we should insure our trees against these diseases and insects the same as we insure our barns and houses against loss by fire or other cause. The beginner is liable to look at this spraying proposition in the wrong way. We get letters at the college saying that in certain localities the trees are badly infested with leaf curl or leaf spot—"What shall we do?" He looks upon this spraying proposition as a *cure* instead of a preventative. We spray our orchards as a preventative not as a cure. We spray at the college for San Jose scale, to prevent it. We are not certain that the scale will be injurious if we don't spray. It is simply as an insurance against that trouble. And so it is right along the whole question of spraying—it is a preventative, rather than a cure.

I will not go into detail to tell you of the different sprays and when to apply them—all that information is given in our bulletins, but I will speak of some fundamental principles of successful spraying.

First, it is necessary, if we are going to prevent these troubles, to study the insects and diseases that infest the particular trees we are growing in our localities. Some localities may have no scale; in that case we would not advise you to spray for the scale. But, if there is scale around in your locality, even though you do not have it on your own place, it becomes necessary to spray for it as a preventative.

Study the particular insects and diseases that the particular trees you are growing are subject to, and then spray these trees to prevent these troubles.

One of the greatest troubles in spraying, for the beginner especially, is the fact that the spray is not put on at the right time. Success depends largely upon doing it just when it should be done. For example, in spraying for the codling moth, we must know that if we do not get the spray on before the calyx lobes close up, it is impossible to get the poison on in such a manner as to make it most effective. We spray therefore for this insect just as soon as possible after the petals fall.

On the farm you will find much general work to do just at spraying time. The beginner in fruit growing, because of these other pressing duties, is often inclined to put off spraying until a more convenient time; but if he does this, he will never meet with the degree of success that he should.

How frequently we see a man spraying—who gets his spray on all right at the beginning and the fruit from these trees is all perfect, but, because of intervening rainy days or other causes, the time goes by, so that when the spraying is finally completed it proves ineffectual and the value of it is lost. In spraying you should learn the proper time for putting on the spray for the particular insect or fungus you wish to combat, and then let nothing deter you from getting it on the trees just at that time.

Many do not realize the importance of thoroughness. Everyone thinks he is doing a good job, but, frequently he does not really know what thorough work in spraying is. If a man knows the life history of the insect that he wishes to combat, it will help him much, and this is what he should study to know.

In many instances we see fruit where the surface facing the outside is free from disease, but that facing the center of tree is badly infested with scale. We must cover all the foliage and we must also cover all sides of the fruit, if we wish to save it from these pests.

Another frequent cause of failure in spraying is the fact that the wrong spray is often used. People write in and say that they have sprayed with Bordeaux and their apples are wormy. There is a reason for this which you can plainly see. Bordeaux mixture does not control insects.

We classify our fruit troubles into: Insects, fungus diseases, and bacteria diseases. Of the insects the chewing insects such as the common potato bug, the canker worm, the codling moth—are all easy to control; all we have to do is to make a thorough application of arsenical poison and the work is accomplished. But arsenical poison is of no use for sucking insects. The scale is a sucking insect; plant lice are sucking insects; and for that reason they are not controlled by these poisons. Contact sprays must be used to kill these insects. To control the San Jose scale for example we must spray while the tree is dormant, before it comes out in foliage, because that is the only time when we can get the spray on strong enough to kill the scale without killing the foliage. A fungicide is a low form of plant life—one plant living on another plant. These plants have different stages of development, just as other plants do. The spores or seeds of a fungus are carried in the

air and lodge on the fruit or foliage and in time germinate, sending mycelium or rootlets into the tissue of the fruit or foliage. After the mycelium enters the leaf we can spray as much as we please and it will do not good. The only way to treat a fungus is to have the spray on the fruit or on the foliage before that little sport or seed germinates. So when the fruit grower writes to us and tells us that his cherry trees are dropping their foliage—"What can he do?" we must answer that he cannot do anything. He might spray and prevent the disease from spreading, but the damage is already done and the disease is working all through the tissue and it cannot be reached by any spray that can be put on. He should have begun thirty days before. So with all fungus diseases, we can control them, we can prevent them, but we cannot cure them after they get inside of the plant tissue. If you have the right conception of these things you will use the right spray at the right time. Our bulletins tell you all about this. You should know, therefore, as much as you can about the life history of these pests—how it is the apple fungus grows? What part of the tree does it attack? And other questions of similar import.

In regard to making a mixture it is well to know a good mixture from a bad one. It is not difficult to use lime and sulphur that we have simply to dilute in water, but when you come to make a Bordeaux mixture and some of those other sprays, it is not so easy. Bordeaux mixture is not simply the taking of lime and copper sulphate and slapping them together; they should be put together in such a way that they make as fine a mechanical mixture as possible. Get the bulletins on spraying and study the proper method of making these sprays.

In regard to the winter protection of trees I have little to say. If you have grown your trees properly during the summer, that is, in such a way that you have obtained a strong, well ripened growth, you have done much to prepare your trees for the winter. That is the most important of all methods of preparing the tree for winter.

Another thing we should do is to protect the tree from its outside enemies. It is a very common thing to see a young orchard planted and go into winter quarters in excellent shape, only to be girdled by mice and stripped by rabbits during the winter. The young trees with green succulent bark seem to have a special attraction for rabbits and mice. If the orchard is well cultivated and happens to be near brush land you will be troubled more or less with rabbits. To insure your trees against this trouble it is advisable to protect them with some kind of tree guard. We have on exhibition at the apple show several devices for this purpose: one is common tar paper, easily obtained, cheap and very effective. Cut the tar paper in strips as long as you wish, wrap them around the trunk and tie together. Again we have wooden veneer strips which are slats of wood made for the purpose which may be soaked in water so that they can be bound around the tree and fastened. Some use coarse screen wire, of about one-half inch mesh for this purpose and it has been found an excellent prevention of mice and rabbits. Sometimes the trees are banked up with soil and this prevents injury from mice.

Perhaps this is enough to be said of this topic, but if there are any questions you would like to ask, I will be glad to answer them as far as possible.

SECOND DAY—MORNING SESSION.

Chairman—It is now past our time for opening and so we will come to order, but before proceeding with the regular program, we will give a few moments to something not on our regular program. We have here with us, Miss Lucy Page Gaston, Supt. and Founder of the Anti-Cigarette League of America, with headquarters at Chicago. She wishes to say a few words in reference to her work, and particularly the bill now before the Michigan Legislature, which she is trying to have put through.

Miss Gaston—Last night at the Land Show I engaged the pen with which the Governor of our State will sign the Anti-Cigarette Bill, which will put the cigarette out of commission in Michigan. Perhaps this is faith, but I believe it is going to be done this present session of the legislature and I feel that this fine body of Horticulturists of Michigan will contribute largely to the success of that effort. I really know of no greater good fortune that can come to this effort to protect the youth of this great State of Michigan, than to have the earnest, hearty and clean-lived men and women who are connected with this organization in line to help promote it.

Michigan has long been the battlefield in this fight against the cigarette. The Cigarette-Jack from Detroit appears at Lansing and undoes the good work that the good people of the State want done, and the bill that was passed by the legislature was one that suited the Tobacco Trust but did not suit the Anti-Cigarette League. Judge Higby, the Ben Lindsay of Michigan, right here in Grand Rapids, Judge of the Juvenile court, has taken the Chairmanship for this State and is leading the fight, and we want you people to line up and do what you can for the bill.

You people are troubled with pests. When a pest appears, you undertake the work of extermination. What is needed in Michigan is a war of extermination on the cigarette. Eleven states have passed absolutely prohibitory laws making an out-law of the cigarette, and cigarette papers, and that is what we want you to do here.

Imagine Ann Arbor without cigarettes! These cigarette-soaked average brains that you are trying to educate in our state institutions of higher learning are not worth the powder to blow them up in a good many cases. It seems to me that all substantial men and women should give this effort their most hearty support, and I will leave you now with the full assurance in my own mind that we can rely on you to do all you can for the good cause.

WATER A PROTECTION FROM FROST.

D. R. WATERS, SPRING LAKE.

Farmers who grow fruit and vegetables have been seeking earnestly for some protection against frosts in the fall and spring. So far no device or plan affording this protection has been found satisfactory.

The loss by frosts every year makes an immense aggregate running into the millions. Smudges of smoke have been invoked but can only be effective in a perfect calm. Even a gentle breeze makes this protection impossible. Firepots distributed through an orchard are weak attempts to heat up all out-doors.

It cannot be done only to a limited degree and even then is only applicable to orchards.

This plan holds out no encouragement to the cotton planter, the gardener or the small fruit grower.

The whole line of experiments for the frost protector so far has really reached a hopeless end.

I have become convinced that water is a sure safe-guard against a temperature even lower by several degrees than freezing.

There is no possible prevention of danger to tender buds, vines or plants by a temperature that approaches wintry mildness, but a mere frost to a few degrees below freezing can be made harmless by water.

My observations through many years as a fruit grower has proven to me that water is the element that must be applied to prevent danger to fruit and plants in the time of low temperature.

A few years ago unusually warm weather set in here in Michigan after the opening of spring in March. Peach and cherry buds were permanently swollen and blossomed out a month ahead of the usual time. In this connection a remarkable cold change came on in April and every one supposed the peach and cherry crops were lost, but with this cold spell came snow and rain and to the pleasant surprise of all the farmers a full perfect crop of the endangered fruit was realized.

Many believe yet that this crop of fruit was obtained despite the cold because of the modifying influence of Lake Michigan. This is nonsense. The water of Lake Michigan in March and April is icy cold and tends to lower the temperature rather than to raise it. The value of Lake Michigan to the fruit growers in what is known as the "Fruit Belt," stretching several miles wide along the lake shore, from St. Joseph to Grand Traverse, is its prevention of growing weather in the spring until the danger of frost is past and its warmth in the fall that prolongs a frostless season into October. Beyond all doubts the crop of fruit the year to which I refer was preserved to the growers through a week of weather with the thermometers down to within 28 of zero by continuous rain and snow.

This influence of water was shown me in a rather remarkable way one spring when the buds of my vineyard were so far advanced as to be in danger from frosts. The night was cold and I feared my grape

crop was gone. My anxiety prompted me to rise early for a visit to the vineyard. I found it covered with a heavy white frost at early daylight. I turned from it in the firm belief that the crop was ruined. But at that time it was perhaps two hours before the sun could get up high enough to strike the vines and in the meantime the wind set in from the south so warm that it rapidly converted that white frost into a heavy dew before the scorching rays of the sun could catch the vines and the injury from the frost was almost entirely obliterated and I realized a fair crop. It is said that a frosted rosebush left on the lawn in a pot can be saved by removing it into a dark room and sprinkling with cold water. It is a well known fact that dangerous frosts are most liable in a dry time, especially when the moon is full and that frosts rarely occur after a day of rain, although the clear up may be with a dangerously cold wind out from the northwest.

These reliable observations point to water as the most hopeful source for a plan of protection against damage from frost. A water system with air pressure, pipes, hydrants and hose, supplemented with a good spraying outfit will save early planted cotton, vineyards, strawberry beds, gardens and orchards of orange and peach from the injury of frosty nights. In this connection I speak of cotton fields because I am told the boll weevil can be beaten by early planting but in that case the planter has frost to fear. I am aware that danger to orange orchards comes in winter as it does to peach buds when unusually low temperatures are experienced. My faith in water as a shield against cold leads me to think a spray of water that would cover the trees with ice would save the buds from intense wintry cold. This, however, is only a suggestion for an experiment well worth trying. If found effectual it would be cheaper than smudges or firepots.

My only aim in this paper is to suggest the possibilities of water for a protection against frost and I submit facts that sustain the theory. If I am correct, the idea can be so developed as to prove of enormous value to planters, orchardists, gardeners, grape and small fruit growers.

We have reached the age of intense farming in every branch for every section of our wide and varied resources. There must be higher culture for both men and soil. The draw-backs are many, but enterprise, energy and intellectual activity can conquer success as in a skillfully conducted battle. The day has dawned when the successful farmer must quit the beaten path of the past and the stepping from the deep, out of the prejudice proudly live and act in the light of an era that invites a marvelous advance with electricity, the gasoline engine, the telephone, concentrated fertilizers, improved machinery and all the inviting attainments of science relating to nature's courtship. Our national progress and the bright future that stretches far down the brightest vista the world has ever seen, demands of the farmer that he take the advance, not as a "Hayseed" but educated, enlightened, a prince among men, the crowned hero of all producers; a scientist so deeply versed in the moods of nature that he can study and understand her, experiment with her many phases and be able to make her his assistant in every change. Nature is not fickle, her change comes in obedience to laws that are of an unchangeable average. These must all be under-

stood and made to serve the important purposes of her most worshipped admirer—The Modern American Farmer.

DISCUSSION.

Question—What effect, if any, would increasing the flow of Lake Michigan through the Chicago Canal have on our fruit belt?

Answer—Probably the same as any river flowing through Michigan.

Question—Our lake level is higher this year than last season—Why?

Answer—This is probably due to the fact that we have had more rain than for several years in the past.

A Member—In answer to the question previously asked in regard to the effect of increasing the flow of Lake Michigan water from the Chicago Canal would say that the most marked effect would be increasing our shipping facilities and thus prove a decided benefit to the fruit belts.

A Member—It is your theory that spraying trees with water when the temperature is 3 or 4 degrees below zero—say at midnight—will prevent injury?

Mr. Winters—If water will protect from frost as it does, why not? If the trees were sprinkled in the winter when there was a very low degree of temperature, say 10 to 25 below zero—the water would freeze as soon as it touched the trees, then would not the ice become a protection to the buds from the frost? I do not pretend to say that this is right. It is only a theory with me, but it seems to me that it is the theory that would work out all right in practice.

A Member—What would be the effect of fresh cultivation in an orchard just previous to a frost?

Answer—I know a gentleman in our locality that cultivated his vineyard going through on Saturday afternoon, that night they had a hard frost and his vineyard was more hurt than those around him where there was no cultivation. As to spraying I think it would be dangerous to spray in the night. If we could spray the trees after the frost was over—it must be done after the frost is through freezing—we could get much better results.

Prof. Taft—Spraying has been tried and has given results. You can do your spraying just as the sun is going down or in the night. The older members here will remember Dr. Kedzie—he used to bring this up at the meeting—the prevention of frost by the use of the spray. He advocated doing this with warm water. The water being warm gives off heat and this keeps off the frost. It certainly has a marked effect. While I will agree that the waters of Lake Michigan do much toward holding back the frost; I think it has the effect of frost prevention because at the same time we have a frost the water of the lake is warmer than the freezing point, and it contains a great deal of latent heat and warms the air and thus lessens danger of frost. But we have another thing that we can rely on even more than this in the planting of our orchards, and that is, the matter of elevation. If our orchards are planted where we have a slope we can there get air currents, and air currents have much to do with lessening the danger of frosts. In many states they use smudgers, but our frosts are so infrequent that

we cannot go to the expense and trouble of procuring pots and storing oil and caring for our orchards in this way. I have known cases where they have used these smudgers night after night, and then thinking all danger was past from the frost, there would come a sudden change in the weather, and before they realized it there would be a cold spell that would destroy the crop. I am in doubt as to the economy of the spray. There is no question but what it is effectual to a certain degree at least, but will the expense and trouble necessary to get it, pay for what you get out of it? I think it would be better to plant our orchards near some large body of water and in proper location where the air currents will be all right, and then you will have no trouble. If one is carrying on market gardening, growing small fruits then I think the water spray could be used to good advantage and profitably.

Mr. Waters—After a heavy rain we never have a frost, even though we have it quite cold, and it is from that principle that I advise spraying vines—not so much the spraying of the vines themselves, but the wetting down of the ground thoroughly. I do not think that just the mere wetting down of the vines will do very much good, but if the ground could be wet down thoroughly, it would do the work, and a farmer can afford to do this. If water is put on plentifully I am very sure that the frost will be prevented. You ask what effect the water has on the ground; the earth is warm and if we saturate the soil with water it creates a warmth that saves from the frost.

A Member—Has anyone had experience with an orchard planted beside a lake of say, forty acres, and from fifty to one hundred and fifty feet deep? We have an orchard on the east side of a small lake, and the land is quite flat—Has anyone had any experience as to whether a small body of water will warrant planting an orchard on that land?

A Member—In regard to fresh cultivation—they asked this question of Professor Vandeman, one of the Professors of Agriculture in Vermont, and they answered favorably to fresh cultivation. My thermometer was showing a freezing point in the crotches of the trees and the ground was crackling under my feet; I was keeping up fires. The ground was just freshly cultivated, and I had nothing injured.

Mr. Monroe—In regard to the influence of Lake Michigan, I would like to make a statement, particularly because it is a matter of a good deal of observation—and if anybody knows of an exception I will be glad to hear of it—and that is this, I do not think we ever lost a tree by cold weather in the winter when the wind was across Lake Michigan. I do recall a small body of water beside which a vineyard was planted, Lake Corey, just west of Chicago, I remember there was a large vineyard on the north side of it, and as I passed it a good many times I noticed that the frost would kill below a certain line right along, while above it, about half way up from the lake level to the higher part, the vine would be all right. Now, I think if it had been planted on the west instead of on the north side of the lake, the water would have had more influence.

Question—There was open water in Lake Michigan the times you speak of, was there not?

Mr. Monroe—Perhaps, but in every case I have investigated where some have said that there was frost loss, such as poor cultivation,

low level, etc. Of course, we want to bar 1906, and even frost came from the northeast, just a land wind from the Polar regions. But I do not think we ever lost a fruit crop by reason of frost in the spring when the wind was from across Lake Michigan.

CARE OF SMALL FRUITS.

ROBT. THOMPSON, ST. CATHERINES, ONTARIO.

Ladies and Gentlemen: It gives me a great deal of pleasure to be here. I have intended to come for a couple of years, but have always been so busy that I could not seem to be able to get away from home. And, as it is, our own annual meeting is being held at the same time as yours here, but my sense of duty is this: We have had the pleasure of several of your best men—we have had the benefit of their experience at our meetings, both local and provincial, at Toronto and other places, and I felt that it would only be simple justice to reciprocate and give you any help within my power.

In a good many ways your conditions are something similar to our own, almost more so than some of the conditions in the State of New York, with which we are more conversant.

The question of lakes, the influence of large bodies of water, interests us because we have the same condition with us,—lake to the north of us, then Lake Erie to the south.

Another reason why I am pleased to be here is that we find when we come among you, we are brothers—we are one people. While, at certain seasons, we pair off, and as in politics and other questions we go our own way, yet as it is in the case of the fruit growers, there comes a time when we bunch together for our mutual benefit. When your worthy secretary was over to see us a year ago, he can recall that we had a land-slide over in Canada something like you have had in the recent past here. And possibly Mr. Bassett would appreciate it more because, as he knows, I happened to be on the losing side; and I think he came out also on the losing side.

But, although, we had a landslide, and you have had a radical change of public sentiment, yet the fruit growers will go on just the same as before, and will no doubt succeed just as well, if we attend to our business as we should. This will come, no matter what the administration. Fruit growers have found that if they do not attend to their business it will go down, no matter what the administration may be.

I do not feel that I want to make a set address, but rather follow the line of asking questions, and in this way, we can get real helpful advice more surely than otherwise, for some of our conditions are not the same as they are with you. We find that certain varieties of small fruits do better on certain soils than on others. Take strawberries, we have the Williams, and I presume that ninety-nine out of every hundred acres of the strawberries grown in our vicinity is the Williams. In some other sections, they do not do well at all. I do

not know very much about your market conditions, what you are growing your small fruits for. The way we look at it, when we go into the fruit business, we want to know where we are going to market; what will give us the best results; and plant for it. I plant enough so that we will have a sufficient quantity to supply the demand and get the price and have a volume sufficient to enable us to get the freight-rates we should. In so doing, we may be able to keep the market supplied, and possibly to the exclusion of other places.

Just to give you briefly an outline of the district there, will say we have a strip of land that corresponds with the level of Lake Erie, and this ridge runs along from the southeast to the northwest. It drops abruptly in most places, and there is a narrow stretch of country running along the foot of the ridge. That level below runs from 15 to 30 feet above the lake level.

Lake Ontario is nearly 3,000 feet above the sea level. Along that stretch of country we grow all kinds of fruits to perfection—peaches, grapes and all those tender fruits, and we are not troubled to any great extent with the frost. Where you get a little higher there is another trouble, the vegetation starts earlier and the frost is more severe than near the water where it is held back. Another trouble is, the bulk of that land further back is heavy. I am inclined to think under certain conditions cultivation would help, if moisture could be kept in the land. Where the ground is moist, that draws the frost away from the vegetation, and we have a crop.

I have different kinds of land. The freeze of sixteen years ago, the 28th of May, that killed our peach orchards, hit me. I had one field with only a ditch between them—one field was clay that we were not working so as to keep the vegetation back; the other was a sandy field and had not been worked. After that freeze I said "I will sell my crop on this field for half price" and after I examined it, I said, "I will sell my whole peach crop on that field for \$5.00." On the other field I had three-fourths of a crop—the freeze went into the vegetation.

We are growing our fruit largely for canning factories and distribution throughout the country. Our small fruits in the first state are shipped through the province of Ontario and the east. Very little of it goes west. Our other fruits, plums, grapes, and to some extent, peaches are sent to the western provinces, where they are competing with your western fruits, and British Columbia.

We are growing more currants and goose-berries than eight or ten years past. Prices then went very low and we went out of the business; but now owing to the markets in the west, we are planting quite a good deal more extensively of currants, both red and black, and of goose-berries.

As to the methods of cultivation I suppose you want that more than anything else. I am a worker and not a public speaker and so I can answer questions better than I can make a speech, and now would like to have you ply me with any questions you see fit.

DISCUSSION.

Mr. Bassett—When I was there in your country, they pointed out to me land that they said was worth \$1,000 an acre—tell us about it.

Mr. Thompson—We have land that is selling as low as \$200 an acre and from that up to \$2,000 an acre. Of course, \$2,000 land has some improvements in the way of buildings. We have land selling at \$1,000 and \$2,000 without any buildings on or buildings that are of little or no value. A good deal of that land derives its value from the fact that a number of people are going out there, retired men on salaried positions, that have had to give up their work, owing to loss of health. And then there are others who, through the influence of stories they read in the papers, and from land agents, and through other influences, have been induced to purchase this land through land agents and have paid these prices for it with the idea that they were going to make a fortune out of it by raising fruit. Land for fruit growing up in our section is certainly on the boom. I thought a few years ago that we had reached out limit, but it is not so.

In the years that are past I have had the oversight of the largest shipping point in the Dominion of Canada, and I have had a good chance to consider the question from all standpoints and I am free to say that while land in our towns and cities is sometimes inflated, yet in the matter of farm lands, I think that even at these prices, the money would be well invested. I have my eye on a piece of land next to where a canal may go through, and I am prepared to give \$600 per acre for seventy acres of raw land for fruit growing. I look for a decided increase even in these prices.

The reason for that is a number of our men are going there to set out peaches, thinking that peaches are the only thing that they can make money on. Many of the people fought against the reciprocity because they were afraid of your peaches. While many feel this way, that there is more money in peaches than anything else, at the same time I have sworn off on peaches, for there has been a great deal more money sunk in peaches there than ever was brought out. And a good many people realize the truth of this, this year. In looking over my land I have twenty acres of valuable land—I consider it altogether too valuable for raising peaches on it. I can grow other things more safely such as small fruit. The reason for these values is we have a large body of people all interested in the one line. We can ship all our fruit at express rates by freight. Where the express is 80c per hundred, we can ship it for 30c by fast freight. To Winnipeg the express rate is \$2.60 whereas we get a rate of 70c. We count on from 150 to 250 bushels per acre for tomatoes, the average is running nearer 500 and some men are getting as high as 700 to 1,000 bushels per acre. Then there is asparagus. I planted three-fourths of a crop for the factory alone. Lately we found the factory was going to pinch us down a little but even then that asparagus has brought in more money than any peach orchard.

(A Voice—Give us the figures.)

Giving figures is hardly fair when none of the conditions and other matters connected with it are given. If we should do this then

the reporters of the papers would give it out that these fruit growers are making their thousands. A man that cannot clear up \$10,000 is no good, they say, and it is such stories that induce a lot of people to go into the fruit business only to be greatly disappointed and to suffer severe loss. There is an expense connected with all these that few people think of. But it is possible to make these large amounts from the land and that is why we look for land to go up to \$2,000 an acre. These people who have bought there of late at these high prices seem to be well satisfied with their bargains and nearly everyone of them could sell at an advance should he put his land on the market. And as I said, the reason for this is that there are those who are making these large amounts out of the land.

Some have said, "I will go to some other point where I can buy land at from \$100 to \$200 per acre instead of paying these large amounts." My advice is to buy close in, even though the land is much higher in price. You are then close to shipping facilities and you are where you can be in competition with the factories, and there are many other advantages that might be named which will compensate for the higher price of land, one of them being that you can buy your supplies at the lowest possible price through companies which you could not do otherwise.

A Member—Explain the inter-planting—do you grow small fruits between tree plants when they are growing up?

Mr. Thompson—When we are planting out orchards, even our currant, we plant them eight feet apart. The first year we plant vegetables in between these. When planting out fruit trees we plant more largely of vegetables. A good many plant strawberries. Where the land is high in value we plant in between those trees raspberries or currants or gooseberries—that is, where the land would be cut up in five or ten acre lots, or where a man is pretty greedy, but if a man has twenty acres the question of labor comes in and this not so often done. We do not plant small fruits in between our plums or peaches or pears but between our apples. We follow that method until the trees get up to 5 or 6 years old or older say 8 or 10 years, and then they require all the land and what we get off the land as a catch crop cost more to grow than what we realize from it. The trees are all the way from 15 to 16 feet each way and up to 18 feet. The favorite distance in putting trees is 18 by 22, or 20 by 20 feet.

A Member—How about your fertilizer?

Mr. Thompson—As to fertilizer used, would say, that we use principally barnyard manure and the straight artificial chemical fertilizer.

A Voice—By that you mean commercial fertilizers.

Mr. Thompson—We are using steamed bone, acid rock for the phosphoric acid. We are using acid phosphate especially where we have vegetables. In that case we use three parts of bone to one part of potash for the trees. That is on fairly light land. On our heavier land we do not use so much potash. If we want to get results quickly that year we use the acid rock. It is a little cheaper per cent on the analysis, and it gives us quicker results on the vegetables. We use this in the proportion of 750 pounds of acid rock, 750 pounds of bone

and 500 pounds of potash. We use about 400 pounds of this to the acre. Where we use from 1,200 pounds to a ton to the acre we get better results.

A Member—What is that on?

Mr. Thompson—On the currants we use every spring from 1,000 to 1,200 pounds each year. We try to get barnyard manure on currants every second year. Then plow down cover crops. Clover is doing pretty well. However, we find that we are getting better results from the straight goods than from the mixed fertilizer dollar for dollar.

A Voice—By straight goods what do you mean?

Mr. Thompson—I mean potash, nitrate, etc. I usually get a carload of nitrate of soda and from two to three cars of potash each year. Some years we do not use it all but it keeps over all right. Among the fruit growers it is getting more and more a custom to use the straight goods rather than the ordinary ready mixed commercial fertilizers.

A Member—What experience have you had in liming small fruits?

Mr. Thompson—We have had some little experience, but I can not see very much results on the clay land where part of it went on orchard without excess of humus. On other land I think it would do well.

A Member—What implements do you use to distribute the fertilizer?

Mr. Thompson—There are several machines made for this purpose. The one that has given us the best satisfaction we purchased from a firm in Rochester.

A Member—How many miles is it from your place to Winnipeg? You stated you had 66 cents a hundred by the carload.

Mr. Thompson—Something like 700 miles.

PRUNING AND CULTIVATING.

O. K. WHITE, EAST LANSING.

Mr. President, Ladies and Gentlemen, Members of the Horticultural Society: Unfortunately I was not here to hear what was said previously, and I may overlap some of the subjects already touched upon. I do not know that I can say anything new to you men, especially those of you who have been in the business for twenty-five years or more. A great many of you have had more experience than I have, but perhaps I can say a few words that will be helpful to some here who may not have had very much experience. And if I say something that you are opposed to, or which is not in harmony with your experience, do not hesitate to let us know.

The pruning and cultivating of a young orchard are very important parts of the growing of that orchard. It is safe to say that the first two years of the starting of an orchard is as important as any two years in its life that you might pick out, no matter what kind of fruit you may be growing. I want to emphasize the fact that correct starting is a mighty important thing, for if you make a mistake, you may never be able to correct it.

Now the important points of pruning a young tree involve the height of the head of the tree at the time of starting and the height of the head of the tree from the ground from that time hence. When you have cut off your tree to a certain height the top of the tree will keep growing away from the ground, but the trunk of the tree never grows longer. The limb that is two feet from the ground at starting will always be two feet from the ground, no more, no less.

If the pruning of a young tree involves the forming of the head; the shaping of it, and its height from the ground, these are all very important things and should be done thoughtfully and carefully. In other words, the forming of the head of the tree involves the distance the head shall be from the ground, whether that tree shall have an open or compact top, whether it shall have a strong or weak top. Whether the orchard shall be convenient for pruning in later years; whether it shall be convenient for spraying when you have to do so. No matter what insects or diseases it may have, will it be low enough so that you can readily reach it and get every disease and insect, if you do thorough work—that is, those diseases which are controlled by spraying? Will it be convenient for thinning of the fruit, if the tree happens to be overloaded? Will it be convenient for the harvesting of the fruit? And lastly and least important, will it be convenient for cultivation? Then to summarize, there are four reasons why we desire to have a low tree: 1. Convenience of pruning. 2. Convenience of thinning the fruit: 3. Convenience for spraying. 4 Convenience for harvesting the crop.

For convenience in cultivating we would like to have a tree well up from the ground, but I have mentioned four good reasons against this one, why a tree should be a low-topped one.

Another reason for having a low tree with a short trunk is that the top will better protect that trunk and make it less subject to that dreaded sun-scald, which we have on southwestern and southern slopes, particularly in the northern part of the state. A short trunk is better than a long trunk, all things considered, for the reason that the tree is more stable, and when the tree is mature and bearing, the fruit is not so readily blown off. I think a good many of you have had more or less trouble along this line this year. Then, all things considered, I think that there is no doubt that a low head and a low-topped tree are preferable. Mr. Hall of Ionia will tell you that he likes to have his Spy apple trees with the lowest limbs as high as his nose, and that is, I believe, about six feet from the ground. I will say now that Mr. Hall's orchard is a self-evidence of a firm determination to carry out that idea. I do not think that there is a tree in his younger Spy orchard that has a limb springing from the trunk lower than five and one-half feet from the ground. He has his own reasons for that, which he will no doubt tell you. I frankly confess that I believe he is on the wrong track, even if he is headed pretty straight up the line.

How high should the trunk be on an apple tree? That depends upon the varieties, the different kinds of fruit. Some trees grow upright, others droop. An upright tree should have a lower head and a shorter trunk. Those that have a tendency to droop, necessarily should have a longer trunk in order to get the same results as the tree that grows



Five-year-old Engles Mammoth peach tree on W. J. Remer farm, Blue Creek station, Berrien county.



Harvesting Engles Mammoth peaches from the five-year-old orchard of W. J. Remer, Berrien county.

upright. These habits, however, can be more or less controlled by subsequent pruning, but you cannot correct all of them any more than you can abolish all the bad habits of boys.

With standard apples and pears the lowest limb should not be lower than two or two and a half nor more than three or three and a half feet from the ground. The rest of the limbs—the four or five limbs forming the head of the tree should be distributed from twelve to fifteen or twenty inches along the trunk.

As far as possible avoid crotches. If you have less than four limbs—only two or three—I will defy any of you to make a tree that will not have a crotch and thus be liable to break down sometime when the limbs are loaded with an excessive crop. If you have four or five limbs on the trunk and well distributed, you will find that it will stand the force of a much stronger wind and hold up much more fruit.

I said I like the head distributed along the trunk about one to one and one-half feet. With the one-year-old peach trees, etc., generally received from nursery men, it is difficult to do this. In this specimen which I show you here, the limbs are branched and crotches cannot be avoided. This is not an uncommon condition for the reason that most of our nursery trees are so apt to be headed like this. (Illustrating.) Having the limbs branched, and for this reason a great many growers are preferring to get one-year-old apple and pear trees that are nearly a whip, also sweet cherry trees and plums, because they can control distribution of the head of the trees and better avoid crotches. The most of us would prefer to have the head start in two and a half feet to three feet from the ground.

In this specimen which I showed you the arrangement is better.

Mr. Wilde—Could you not cut off all the limbs?

Answer—Perhaps it would be all right, but I would prefer to have one-year-old trees mere whips they are, at one-half the price than do that.

Now about pruning this tree. Cut off the limbs so that it will balance up the tree. In digging trees the nursery man cuts one-half to three-quarters of the root system off, especially in two-year-old trees. Here is where we can govern as to whether this will be a compact or an open headed tree. Sometimes we cut the limbs in this manner (illustrating) but I maintain that we should select the place where to leave the top bud. If the end bud is alive and healthy that will develop the strongest growing shoot. If the end bud is weak or injured, the next bud lower down will develop the strongest growing shoot. With trees that naturally grow up like Spies or Sutton Beauty, the end or top bud should always be on the outside if possible, but with such as the Greening and the Tolman Sweet—leave the end bud inside or on the side. Cut off the limbs about one-fourth inch beyond the buds. If a longer stub is left, decay may start in. If we cut too short then the bud is liable to be injured.

Many would cut it off two and one-half feet high, but that makes the head lower, too low, for you want the lower limbs to be fully that high, so you can cut off higher up, allowing room for a well distributed head.

A member—How deep would you set that tree?

Mr. White—One and one-half or two inches deeper than it stood in the nursery row.

Question—Shall we leave the leader or cut it out?

Mr. White—If you leave a leader, sooner or later the center of the tree becomes thick, the leaves and limbs are shaded and become unhealthy, die and drop off. Then the center limbs of the tree resembles a broom upside down, long poles with a bunch of limbs on the top. There is no way to get the fruit but to climb after it.

A Member—Is not the growth liable to go into that one heavy limb?

Mr. White—Sometimes it might, and that is one reason why we should cut all the scaffold limbs back the same length as nearly as can be.

Question—Is there any danger of sun-scald with so much trunk?

Mr. White—No. I think not. (Illustration of two peach trees one year old.)

Question: Will not the original limbs on a tree make more solid crotches than the second growths?

Answer—It will make a better top if these limbs (illustrating) are cut away. Some trees will break down more from crotches because of weakness. The limbs should be so trimmed that the heaviest side will be toward the south or from which ever way the prevailing winds come, that is so that the heaviest part is toward the way from which the winds come.

Question—What would you prefer to use, the pruning shears or the pruning knife?

Answer—I would prefer pruning shears, rather than pruning knife, unless you have gained some experience, for this reason, when I cut off a limb like this (illustrating) if I not very careful, I am liable to wound the tree higher up in this manner (illustrating).

Question—If a tree is planted two years, is it advisable to prune the tree during the summer time where there is heavy growing.

Answer—Sometimes yes, sometimes not.

In passing I want to say a few words about "rootgall." In the case of apples and pears there is really no need of being so much alarmed as some have been. The New York, Geneva Station has found out by thorough experimentation over a period of nine or ten years that there is no special difference between trees that when planted have the gall and those that did not have it. (In that time no material harmful effects were evident.) However, in the case of peaches the gall will have a bad effect within a year or two. I saw peach trees this last summer that had root gall on when planted and the owner did not know it. Within a year gall knots grew on those trees as large as your fist. It would be well not to plant your peaches close to where you have raspberries, if you have any idea that they have been troubled with root gall, for it is the same disease on both.

A Member—Do you think it is contagious?

Mr. White—Yes, it certainly is contagious. The young tree would be just as apt to have it and die the same as the other.

In forming young growing trees I do not think there is any particular harm in cutting off branches in the summer that are undesirable if you do not reduce the breathing surface too much. If you want to

check the growth of a tree you may do this, but when the trees are young they should be stimulated to grow fast. The first year or two the first pruning of the tree is most important to make—whether the limbs are well distributed or whether they are bunched, whether weak or strong, whether well set or have crotches. Some of you are planting in the spring. If you are planting in the fall you had better leave the pruning back of the top until spring, because there may be some winter injury follow and if you have pruned the tree after planting in the fall and it gets injured, it may destroy the top you have tried to make.

If you are planting in the spring you may prune the tree just before or just after planting as you see fit. Most people will find it better to wait until after planting. You are liable to do damage if you use a knife but this is not the case when you use a shear.

Now a word about the cultivation of a young orchard. Most men prefer to cultivate orchards right after they are first planted. The importance of getting the tree to growing vigorously and rapidly when young cannot be over estimated. It must be stimulated as fast as you can, as long as you do not stimulate it late in the season so that it will be liable to winter injury. Cultivate the young orchard as early in the spring as you can and give it enough frequent shallow cultivations to break up the small lumps, conserve moisture, kill weeds, so as to make as large a feeding surface for the soil bacteria, soil moisture and soil acids to feed upon and liberate plant food and consequently to stimulate its growth.

Conserve moisture and liberate plant food by making the soil particles small. With frequent cultivation the surface or soil will be kept from baking and packing. Then it should be discontinued about the first of August and a cover crop planted.

Put a leather or rubber on the end of the whistle trees next to the trees and keep off all projections of the harness, etc., to prevent breaking limbs or in any way injuring the trees. Keep the man, whom you are hiring to cultivate these trees, in good humor. If you do not, you may have some experience such as I did with a hired man of ours when he got miffed at something and did more injury to our orchard in one week's cultivation that came to it in three years before. If you are inter-cropping with corn or beans, the cultivation of these crops will suffice for the cultivation of the orchard but if you are using clean cultivation in the orchard do that just as faithfully as you would for a potato or corn crop. These young trees need plant food and plenty of moisture. Discontinue the cultivation about the first of August and put in the cover crop so that these trees will be hardened up for winter. You have stimulated tender excessive growth. Put in the cover crop so this will harden up for winter.

DISCUSSION.

Question—Would you cultivate a young pear orchard as you just stated?

Answer—Yes, unless the blight was very prevalent I would depend on the pruning knife to keep it in check.

Pears do well in a sod mulch system and are not so apt to blight.

Question—What time would you plant trees in the fall?

Answer—It would depend upon the man and the conditions. One advantage to some men is that they do not have so much work to do in the fall and so will take more pains. If you get a winter like last winter and the trees stand in the ground all winter without any moisture - if it is a long dry winter and the ground freezes deeply, the tree may not come out in the spring in good condition; if the soil is exceedingly wet or exceedingly dry it would be the same. All things considered, it is preferable to plant in the spring, especially peaches, and other tender fruits.

Question—I wish you would touch upon the pruning of a tree the first year after planting—the second season.

Answer—It would involve taking out the excess branches—those that are too low, those that grow into the center and those that are crossing and interlacing.

Question—Would you advise pruning heavily and so encouraging the formation of two or not more than three lateral branches on each one?

Answer—No, you leave the strongest and best positioned one so that the tree would keep opening up in the direction you wanted it to—for a spreading top or to go straight up.

Question—Suppose you get a three foot growth on plum trees how much would you cut back?

Answer—I would cut it back to about one foot.

Question—I have heard it said that $\frac{2}{3}$ of the growth should be cut off. Suppose the growth was only four inches what would you do?

Answer—Cut back the branches in peaches and plums or perhaps cherries to at least one foot or perhaps eight or ten inches, all of that growth, not leaving any more than that.

Question—But suppose it only grew four inches?

Answer—Then just leave that—do not cut off any.

Mr. Hall—Mr. White criticised my methods somewhat.

“Open confession is good for the soul.” If he will confess that he does not know anything about pruning the Northern Spies I will confess some things.

I have a block of Baldwins that are headed two and one-half feet from the ground and they are thirty feet high and I do not know how to get them down. I have an orchard of Northern Spies headed right up and they will never be over twenty-four or twenty-five feet high. I have an old tree that father set out sixty-seven years ago, a regular old monarch, and we get all the fruit off that tree with a twenty-four foot ladder. It still has more years before it than I have—for it is healthy.

What do you want of the body of a tree? I suppose you want a body to carry the fruit up. I have picked a good many bushels of fruit from limbs good and strong that bended over so that the fruit touched the ground. I think people do not give their trees a chance to develop if they are troubled about going too high. If you give the Northern Spy a chance to spread it will not go too high. A Northern Spy must not be pruned as you would a Baldwin. I have a theory that they have not room enough, for they were planted when land was only ten shillings an acre. I saw the cut of an orchard belonging to Henry Clay in the State of Ohio. It was represented to be an ideal

low headed orchard. I estimated the height and the lowest fruit was about seven feet from the ground. They were using a six-step ladder and the man was standing on the fourth step and the lowest apple was just even with the man's head. This is higher than I wish to go for fruit. Get the fruit down where you can reach it.

A Voice—I think I can tell Mr. Hall one or two ways that he could get his high tops down. He can go up and cut them down with a saw. If he has any scale, it will do the business for him.

Mr. White—I think I qualified my remarks when I said that different varieties had to be treated differently. If I did not say it in that many words, that is what I meant. An upright tree should be given a lower trunk than a spreading tree. I think Mr. Hall ought to say, when he says that his limbs are strong, that they are six feet from the ground and still he can pick the fruit from the ground very easily—and he should say that he has all the way from eight to fifteen branches forming the head of the tree. They are long and slender and bend to the ground. I am watching that orchard with a great deal of interest for the reason that I suspicion that Mr. Hall will find that, as these trees grow older, so many branches forming the head of the tree, particularly in the Spy, the limbs will push one another apart. Maybe they will not but I expect it. Twenty-eight bushels of Spies off from a twenty year old tree and pick them all with a 12-foot ladder is pretty well, but I will say this, I have known of cases where two persons picked from Baldwin trees, 140 bushels in 8½ hours. These trees could not have been of an upward growth due to the pruning they received.

A Member—I have found that if the trees whether pruned or not, if they have plenty of room, will not go up—the limbs will come down.

Another Member—I had a young orchard that went up and up so that I had to use a 22-foot ladder and there was a lady that picked 91 bushels in a day from those trees.

Mr. Welch—The old re-occurring question of our demand of the nurseries, I think, should be emphasized and that is that they should furnish a good, straight tree and all right.

A Member—I think the after-pruning has as much to do with it as the first pruning.

Another Member—One speaker said that he did not want sod to start an orchard on. I think that is right and now I would like to ask if a crop of corn were put on the orchard, would it stop the growth of that tree enough?

Mr. Graham—I want to get the growth as soon as I can and I failed to get that where the sod is plowed under. You cannot get a real nice condition to produce an early growth. I want to get a growth as early as possible so that it will ripen up by the first of August and I have failed to get the tree to stop growing by the first of August. By that time the sod begins to rot. Corn has a tendency to ripen up an orchard but when each hill of corn is 4 feet from your tree, it does not stop the growth very much. I planted a peach orchard and it was planted on sod and I presume I had lots of growth 5 feet long and they are just as green as they can be today with the leaves all hanging on.

A Member—I suppose you have better land than most of us fellows.

Mr. Graham—I agree with you.

A Member—Can someone tell us about cutting out 35-foot tops, will it not do more harm than good?

Mr. Friday—I have had some experience along this line. You can cut it down as soon as you have growth inside to shade the limbs, especially on the north side of the tree. I have had some trees where quite large limbs were laid bare to the sun by cutting and I had sun-scald.

Mr. White—If the top limbs are cut off, they should be cut off above lateral branches growing toward the outside of the trees then put a little white lead on the wound.

Question—Would you plant all trees in the fall?

Answer—No, I would not.

Apples and pears and sour cherries may be under favorable conditions but sweet cherries and peaches never.

Question—When is the best time to prune the apple and peach?

Mr. White—I suppose this refers to an old orchard. I think it is generally considered that the spring time is the best time to prune either apples or peaches. I have seen people prune peach trees in October and in every case that I know of it has resulted disastrously. Any wound that is made late in the fall has no chance to heal until the next spring. That exposed growing tissue, exposed to the dry winds and the cold is liable to die back quite a little, and the healing over of the wound can not progress, even when springtime comes. Spring pruning will stimulate more growth than summer pruning. If the trees are making a normal growth of say eight or ten or twelve inches, or not making that much growth, spring pruning would be preferable.

Question—How early in the spring would you begin pruning; or how late in the winter?

Mr. White—I always answer this question this way: If I had a mixed orchard of apples, pears, plums, cherries and peaches, I would begin on the apples first, then take the pears and plums, then the cherries and then the peaches—begin with the hardiest fruit first and leave the tenderest—the peaches—until all danger of winter injury is over.

Question—When would you begin to prune an apple tree?

Mr. White—I would not begin to prune an apple tree, until about the first of February. Every wound that you make before this has no chance to heal over and dries out and freezes back, and there is danger that it can not readily begin to heal over when springtime comes.

A Member—Mr. Graham's suggestion or I might say his philosophy, as to his method of treating a young orchard, is this, as I understood it: He would plant his young orchard, growing corn one year, then growing another crop of corn on that same ground, and then following this with another crop. Now we would not expect the ground the second year to be just as good as the year before. We would not pursue any such method as that; for we are convinced that some system of rotation is necessary in keeping the soil up. But somehow it seems that, when we come to grow an orchard, we pursue methods that we would not think of using on any other crop. We get our ground reduced down to where it would not grow any profitable farm crop and then practice

clean cultivation for a few years. Lots of peach orchards that have gone to pieces have been handled in that way, but I think that in this connection, it is a good plan to put up some word of warning against committing that same error in growing our orchards. Do not, for the life of your orchard, take up with a method that will put your ground out of commission.

Mr. Graham—I would be very glad to explain that. Strange as it may seem to the gentleman, I have had much better success in growing peach orchards on ground that was run down and regarded as poor, as it very well could be. In fact, the best orchard I have ever grown was on ground that would not grow white beans. If I were going to pick out peach orchard land, I would get land that would not grow five bushels of wheat per acre. I never had any trouble in getting plenty of growth on one or two year old trees.

The difficulty is, we grow all of our trees too strong for the first two years and then we neglect them. We do not want too much growth in one or two years. Let us grow them carefully, but not get them with soft, spongy wood but get strong, hard wood the first year or two, then, when they begin to produce fruit, put something on to produce fruit. I have done this on several orchards and the only success I have ever had in growing a good bearing peach orchard is to do it in this way. There is no theory in this thing—it is experience. I planted my trees, not on sod ground, but on open ground. I put on a crop of corn, then a second crop of corn and a little fertilizer with it, then plowed the orchard every fall. I do not put the cover crop on one or two year old orchards, especially peach orchards. Many are plowing a good furrow up on each side, leaving a dead furrow, putting the plow down just as deep as a good team will draw it. Then put on the cover crop the third year, then put on the fertilizer. That is my theory, and I might say also, my practice.

Question—What is the average life of your peach orchard?

Mr. Graham—About five years now. It used to be ten or fifteen or twenty years. Now the yellows and little peach get them.

A member—The average life of a peach orchard, as ordinarily handled, will be from fourteen to twenty years, where the trees are not taken by disease. The thought I have is that we do not give our orchards what we give our farm land, or they would last longer than they do. They ought to have a stronger soil, so that they will make a more vigorous growth.

WHAT IS NEW IN SPRAYING.

A SYMPOSIUM BY PROFESSORS PETTIT, WHITE AND EUSTACE.

Introductory Remarks by Professor Pettit.

Friends—I should like at this time to make a plea for the old home-made lime and sulphur. Eight or ten years ago—yes, even five or six years ago—a good strong spray of home-made lime and sulphur used to take care of the bud moth, the pear psylla, and used to greatly reduce the numbers of plant lice. Today, with our present practice, using the commercial lime and sulphur cold, the bud moth is affected little or none at all and the plant lice appear in due time in spite of the spray.

Voice—We do not use the commercial spray but do use the home-made lime and sulphur put on cold.

Professor Pettit—On parts of trees that we sprayed with the old home-made preparation the eggs of plant lice hatched all right but the young did not settle down. The coating of sludge seems to prevent them from settling down and starting house-keeping.

Professor Pettit—Are you familiar with the action of lime and sulphur on a scale insect? It takes the oxygen from under the scale and then seals the scale down smothering the little insect that is hidden under the scale. Now, I am speaking for home-made lime and sulphur merely as a spray for scale and not as a fungicide. When lime and sulphur is used as a fungicide the commercial article may be better than the home-made for all I know. The advantage of the sludge in the home-made spray is that it gives body to the mixture and makes more of it stick around the edges of the scales. When you paint a house you use oil and turpentine and then put in lead for the body. The oil and turpentine would do some good but with the lead added it sticks much better and more of it stays where you put it. Just so the sludge holds more lime and sulphur solution in contact with the insects. It also stays on better.

A Member—How do you regard the old way of preparing lime sulphur—15-20-50—that makes a flaky whitewash? The last few years we have used a concentrated article and we did not try to get rid of the sludge. When I make up a batch of the stuff I run the whole thing through the screen into the barrel, and when we wanted to use it then we shook up the barrel. I have found this, that where an excessive amount of lime was used as in the old-fashioned manner of preparing it, it makes a flaky whitewash. The sludge as prepared under a concentrated formula makes a sort of paint that sticks on to the tree and turns the water off. In this respect it is better than the old whitewash.

Question—Do you put it on cold?

Answer—Yes, though that is not always expedient, it is at times more convenient. The main fault that I have with it is that it does not spray well when cold. There are little spots that it does not cover.

Professor Pettit—In washing dishes, hot water is better than cold



Cherry Orchard of Guy Tompkins, Grand Traverse Peninsula.

and just so it is with the spraying. Warm water will spray better than ice cold water.

Question—What about the plant lice?

Answer—A tree well coated with sludge seems to prevent the young from settling. The eggs some of them hatch but the young do not seem to be able to start feeding. Perhaps they become weakened by the spray. At any rate trees sprayed with lime and sulphur in which there was plenty of sludge have less plant lice later in the season than those unsprayed.

Prof. White—Ladies and Gentlemen, Members of the Horticultural Society:

My part in this discussion is to talk a little about the control of the apple scab and the effect of lime-sulphur and Bordeaux mixture and then a little about the control of the peach leaf curl.

This past season has been an exceptional year for apple scab. There has been a great deal of moisture and conditions have been unusually favorable for its growth. Many people who have sprayed have had the apple scab and sometimes almost as bad as in orchards that have not been sprayed. I have seen a great many instances of this throughout the state this last summer. Where lime-sulphur has been used, the commercial lime-sulphur at various strengths ranging all the way from 1-25 to 1-50, I have seen no apple scab on some of the most susceptible varieties we have, like the Winter Banana, Snow, McIntosh, Red Canada, etc.—just as clean as you could have made them if you had washed them with lye. I have tried to find out what the difference was between apples that were sprayed well and those that were not, to find out why, where people had sprayed, there was still the scab as well as where they had not sprayed. What was the difference? There was evidently a mistake made somewhere and where was it made? They had either failed to spray at the right time or they had not been thorough. That may seem contradictory to some of you men's experience but as I said before, I have seen so many instances all over this state where lime-sulphur has controlled the apple scab on many of the worst varieties that we have that I feel that where spraying fails to do the work, faulty spraying must be the cause. I call to mind an instance in a northern county where lime-sulphur and Bordeaux were used in the same orchard on the same days by the same men applying them and with the same spray outfit. Conditions were the same, except that some trees were sprayed with lime-sulphur and some with Bordeaux mixture, 4 pounds copper sulphate, 5 pounds lime, to 50 gallons of water. In so far as it was tried, the lime-sulphur showed just as good results as the Bordeaux mixture. I am very sure from an experience of the past two or three years, that commercial lime-sulphur, thoroughly applied and at the right time, will control the apple scab and I am going to recommend to every fruit grower in this state that asks me about the value of lime-sulphur as compared with Bordeaux for apples, that lime-sulphur used as it should be, will do the work. But I will not say, however, that it is better than the Bordeaux or that the Bordeaux is better than it is but it is more convenient to use. There is no wearing out of nozzles or of cylinder plungers, etc., as with Bordeaux mixture.

I have in mind one orchard of 70 acres where a man attempted to

spray with two power outfits. One of these outfits failed to work, consequently that whole 70 acres had to be sprayed almost entirely with one power outfit. They began on the same side of the orchard each time and when they had finished the orchard it was eight days later. Every one of you would agree with me if you had seen that orchard, that it was an easy matter to notice as you went through the orchard, the effect of the the first, second and third days, the work showed up all right but then one began to notice that the scab grew worse. Where the apples were sprayed on time, there was no scab. Where the apples were sprayed on all sides and almost at the right time, there was but little scab, but later, the scab began to appear and for this reason: The apple scab comes from a little fungus that reproduces itself by spores and if that apple fruit or apple leaf is not completely covered and kept covered with lime-sulphur or with Bordeaux mixture—if they are not covered before the spore of the apple scab germinates, I think you may rest assured that the scab will not be controlled. The point is, we often wait a few days too late and the apple scab has gotten underneath the skin and then the application of spray does no good.

A Voice—What is just the right time?

Answer—From what observations we have had, we would begin on Canada Red, Winter Banana, etc., when the blossoms are $\frac{3}{4}$ ths or $\frac{4}{5}$ ths fallen. I see no danger of destroying any bees at that time and if weather conditions are favorable to the apple scab, and you do not spray it as early as that, you will have trouble. Unless you do so early enough so as to keep the little apples completely covered, the apple scab will get the start of you and you can't help it. Keep the fruit covered that is the secret of it.

This year some of the spray was washed off or it rained so that you could not spray when you should and for this reason, many had the apple scab. The point I want to make is this, it is not the failure of the Bordeaux mixture or of the lime-sulphur but it is all on our part and for the two reasons I have given.

We can use any standard commercial brand with safety, one to forty. Mr. Welch of Douglas reports that he used home-made concentrated at slightly weaker strength than that and got very satisfactory results.

A Member—If you have any chance of having a cold May, would it not be a safe thing to spray just before the bloom?

Answer—Yes, under ordinary weather conditions you should spray first, just before the blossoms opened, second just after the blossoms fall; third again in 10-14 days and then about the first week in August. In the second summer spray, you must begin to spray before all of the blossoms have fallen from the tree, because the middle blossom of the cluster comes out and opens and drops its petals before the others have completely developed and if you wait until all the blossoms have fallen, some of this first fruits will have the scab started and that is where you get bad results. Do not think you can wait for all varieties to get in shape for spraying at one time. I have in mind two men who went into the orchard renting business and they had an orchard of Spies, Early Harvest, Maiden Blush, Red Astrachan, Ben Davis and some other varieties. They were as fine trees as you ever saw but they waited to spray the whole orchard until the Spies were ready. That

was wrong and of course, their spraying did but little good. I remember a season when we got the spray on the west side of some McIntosh trees, then waited for two days for the wind to be favorable for the east side and there was scab on the one side while on the other there was none at all.

Question—Suppose we were having a rain storm at that time. Would you go on and spray?

Answer—Yes, just as soon as possible.

Question—Is lime-sulphur a better fungicide with the arsenate of lead or without?

Answer—Yes, it is, although I would not say it is much better. Arsenate of lead has some fungicidal value in itself.

Question—Is there any advantage in using Bordeaux mixture before blossoms open instead of lime-sulphur?

Answer—I could see no reason why such a practice should be followed. Then too, russetting is just as apt to occur before the blossoms open as after they fall.

In a season where apple scab is so severe, I do not mean to say that the ordinary number of four summer sprays will absolutely control scab, because in the rainy weather a good deal of the spray will be washed off or diluted. I do not know that it is always economical but under such conditions, it is no doubt necessary to do more spraying in order to completely control it. Perhaps make an extra application or two.

A Member—I have lost some snow apples. I got through spraying for the codling moth as I supposed—my snow apples were perfectly clean. It was not yet time to spray for the second crop and right in them my snow apples scabbed up. I think if I had put in one more spraying, I would have saved those snow apples.

Answer—In other words, if you had kept the fruit covered you would not have had the scab.

A Member—What about spraying for the peach leaf curl?

Answer—We have depended for a good many years upon Copper Sulphate solution, $2\frac{1}{2}$ to 4 pounds Blue vitriol crystals dissolved in fifty gallons of water to control peach leaf curl. This was applied before the peach buds swelled and was used almost universally until San Jose scale came into southwestern Michigan. The reputation of lime-sulphur as a fungicide as well as an insecticide made orchardists there wonder if they could not depend upon their spray for scale to control the curl leaf also. It was demonstrated that a 15-25-50 formula, boiled and applied hot would do the work all right. Then the commercial lime-sulphur came and fruit growers used it for scale and found that that would control the leaf curl if applied early enough in spring. Thus the spray of copper sulphate for leaf curl was eliminated where spraying for scale was necessary.

But where spraying for scale was unnecessary, there has been considerable discussion as to which was best, strong copper sulphate solution or Bordeaux mixture and whether a weaker mixture of commercial lime-sulphur could be used satisfactorily or not. At the last meeting of this Society and at many Farmers' Institutes through the state last winter, speakers recommended Bordeaux mixture as the only spray

for curl leaf. I could see no particular advantage in using Bordeaux in preference to copper sulphate and had much confidence in lime-sulphur. I wanted to settle this dispute so I arranged for a comparative test of copper sulphate solution $2\frac{1}{2}$ pounds to fifty gallons of water and commercial lime-sulphur $2\frac{1}{2}$ gals. to 50 gallons of water at Hart on the farm of Benton Gebhart. The varieties selected were Elberta, Francis and Engles Mammoth. Two rows of trees crossing the blocks of these three varieties were sprayed with lime-sulphur. On either side of these two rows copper sulphate solution was used.

When Professor Eustace and I visited the orchard about the first of June, just as curl leaf was stopping, we could detect the rows of trees sprayed with lime-sulphur as easily as could be. The results were exceedingly plain and the lime-sulphur had almost absolutely controlled the leaf curl. Hardly a leaf in a thousand was affected while beneath the copper sulphate sprayed trees there were many leaves which had curled and dropped.

Question—What time did you put that on?

Answer—Before the buds swelled in the spring about the first of April. Many fail by waiting until the buds have swelled and the little leaves appear. That is decidedly too late, for curl leaf will be already intrenched if weather conditions are at all favorable. Now copper sulphate solution costs about $12\frac{1}{2}$ to fifteen cents per bbl. of 50 gallons. Bordeaux about 25 cents and lime-sulphur $2\frac{1}{2}$ to 50 about 23 cents. You can take your choice.

SELECTING THE SITE FOR AN ORCHARD.

PROF. H. J. EUSTACE, MICHIGAN AGRICULTURAL COLLEGE.

There is no question but what the selection of the location for an orchard is the most important matter the prospective fruit grower has to decide. If mistakes are made in other matters, as the selection of undesirable variety or too close planting, they can be corrected, though it will mean severe losses and additional expense, but it can be done but a poor site cannot be bettered.

Any traveler in almost any part of Michigan can see thousands of orchards planted in places where it would seem that not one thought has been given to the location by the owner. Orchards that have never produced enough fruit to pay for the trees and never will do so. The big freeze of 1906 taught many Michigan fruit growers a very expensive lesson but already some seem to have forgotten this and others have gone into the business without knowing or informing themselves of very recent horticultural history.

In the selection of the orchard site, several things must be considered together and not simply one or two as is so often done. The soil, the elevation, the drainage both of the soil and air, the facilities for shipping and securing sufficient help for harvesting must all be considered together and it would be not very difficult but very unsatisfactory to say which one is the most important.

Fruit is a perishable product and should be handled carefully.

While it is probably better to get a good soil, some distance from the shipping point than to take a very poor soil close to the shipping station, it is always a serious question to haul fruit, especially the tender kinds as peaches and plums, for long distances and over hard roads. For the very tender fruits as berries, it cannot be done at all.

There are in Michigan some very successful growers who have to haul the products of their fruit farms long distances, eight, ten, twelve, fifteen and even twenty miles and even under this handicap, make money but this hauling expense is always with them and always cuts into the profits seriously.

There is not a successful orchard in Michigan or anywhere that is located on low, wet soil and observations in a large number of Michigan orchards always confirms the principle that it is high lands that are the best for fruit growing. This does not mean an immense hill but land that is higher than the surrounding territory. The reason why this is so desirable is quite apparent on a moments thought. Fruit trees cannot stand a great amount of cold. Cold air always settles in low places. Furthermore, frosts during April and May are quite common and about this time of the year, the fruit trees are in bloom. The frosts at that time will destroy very many or all blossoms and thereby ruin the crop for that year. On the high lands, these spring frosts are not nearly as frequent nor as severe so the prospective orchardist should give good heed to the elevation of the future fruit farm or that part of the farm that is to be used for fruit growing.

To plant orchards upon some of the low level land that is being offered for sale in Michigan and recommended as good fruit land, is nothing more than a waste of money because a profitable crop of fruit never will be produced upon land of this kind.

The more observation and study that is given to soils in connection with fruit growing will be seen that fruit trees demand quite strong soil. There is some difference in this regard, depending upon the different kinds of fruits. Sour cherries will do well on quite light sandy soil even if it has not a sub-soil. Peaches will do fairly well on comparatively light soil but apples must have a good strong soil with a clay sub-soil. While it is very true that all these kinds of trees will do well on a great variety of soils and that there are orchards in Michigan that are growing on poor soil and producing some fruit, yet to plant an orchard that you expect will take care of you in your old days, you must see that it is planted on good strong soil that would produce a very large crop of oats or corn when it is well taken care of and fertilized with a reasonable amount. The accompanying picture, figure one, will give you an idea of an apple orchard planted on poor, light, sandy soil without a clay sub-soil. This orchard was planted in 1899 and is therefore, thirteen years old and has been given good care all of that time. The very poor growth has been made. The other picture, figure two, shows a tree seven years old planted on good strong soil and given good care that has already commenced to bear profitable crops.

To summarize, get first a good site as regards air drainage. Then see that the soil is a good one that will produce good farm crops. Secure it if possible near a good shipping point and on a good wagon road to

the shipping point. Also consider the matter of securing sufficient help to pick and pack the fruit and pay an extra price for these things rather than try to do without them.

M. A. C. STUDENTS' SPEAKING CONTEST.

Three years ago the Michigan State Horticultural Society introduced the plan of having the senior horticultural students at the Michigan Agricultural College contest for cash prizes of \$60 in giving five-minute addresses at the annual meeting; also in judging and identifying some of the plates of fruit on exhibit at the same meeting. This has resulted in the most interesting part of the whole program and great credit is due to Prof. H. J. Eustace of the College and his students for the great success secured. Other states have copied the plan with more or less success.

This event at this annual meeting was even better than ever before, fifteen young men taking part in the speaking and it was very difficult for the audience to decide as to which ones did the best. Each one did himself credit and the following papers will show the practical nature of the subjects selected and the satisfactory way in which each was presented.

THE RED GRAPE.

H. F. MINERS, ST. JOSEPH.

(First Prize Address.)

During the last decade Michigan Horticulture has suffered a great many serious setbacks and large amounts of money have been lost through disease but to my mind Michigan grape growers have never had a more serious disease to contend with than the so-called "Red-Grape" or downy mildew. Hundreds, yes, thousands of acres of grapes have either been ruined or else partially ruined during the present year in southwestern Michigan through this little understood disease.

Coming as it does in the early summer its advance is not noticed until it is too late. It makes its appearance in early summer as a white cottony mass on the canes and the under side of the leaves. Since this growth is not at all conspicuous in appearance it is not noticed until the fungus attacks the berry along in August. The berry then turns a pinkish red long before it is time for it to ripen and about the time it should ripen the berry shrivels up and is easily shaken to the ground, thus either ruining the bunch or else spoiling its appearance. Since none of this white cottony mass appears on the berry, to the casual observer there is seemingly no cause for the disease.

Along in the early part of the summer, shortly after the fungus first appears little spores or seeds are formed which are blown about the

vineyard and give rise to a spread of the disease. However, these little spores or seeds are not hardy and will not live over winter but along in August more spores or seeds are produced which are hardy and frost-resistant and which live over winter to reproduce the disease again the following spring.

Wet weather seems to be particularly favorable for the production of this disease and it is at its worst during a wet year. As a natural consequence it spreads worse during the very hot weather following the rainy periods.

However, the disease can be thoroughly and absolutely controlled by a systematic spraying with Bordeaux mixture. The same spray may be used which is used to control black rot and six applications should be sufficient. Better still, a spray should be applied just before each rainy period, the time of which can be fairly accurately determined by a careful study of the weather maps and bulletins. Where the six applications are used, however, spraying should begin about the time the flowers open and continue every two weeks thereafter until five or six sprayings have been applied. Great care should be exercised to see that the spraying material is applied directly to the under side of the leaves for it is here the disease is worse.

It is a known fact that Michigan grape growers are very reluctant to take up any preventive or control measures and in the past in a good many sections have absolutely refused to spray their fruit. During the present summer I saw vineyard after vineyard where almost every grape could be shaken to the ground. I saw hundreds and thousands of acres of profit turned into a loss. I saw grapes loaded in cars in more than one shipping point in southwestern Michigan which were not fit for hog feed. I make this statement because I happen to be a farmer in the district which I have mentioned and I know it to be true. I know of a good many prosperous and seemingly well educated farmers who scorn the idea that they must spray their fruit and laugh when you tell them that a continuation of present methods mean the ruination of the grape industry, but unless they are willing to listen to good authorities such as are provided for by our government and state at their experiment stations and colleges and take the proper precautions to control this disease and others, the grape industry of Michigan will soon become a thing of the past, and so again I repeat gentlemen, that unless the farmers wake up to the fact that they must take drastic measures to control the red grape, the black rot and the like, just so sure are we going to witness the death of one of the greatest farming industries that southern Michigan has ever known.

THE SULZER APPLE BILL.

I. J. WOODIN, OWOSSO.

(Second Prize Address.)

Mr. Chairman, Ladies and Gentlemen:

It is my purpose this morning, to give you a brief discussion of the Sulzer Apple Bill recently passed by Congress. There are few growers who thoroughly understand the requirements of this bill as to the packing, grading, and branding of apples. As my time is limited I can only mention a few of the more important points, and not go into detail as I would very much like.

The Sulzer Apple Bill deals with the grading, packing, and branding of apples. It was passed by Congress and signed by the President, August 3, 1912. It provides that:

(1) The barrel stave shall be $28\frac{1}{2}$ inches long, the diameter of the head $17\frac{1}{8}$ inches, the distance between heads 26 inches, and the circumference of the bulge, outside measurement 64 inches, making as near as possible 7,056 cubic inches;

(2) There is to be but one grade and the requirements of it are that all fruit in one barrel shall be of one variety, normal shape and well grown specimens for the variety. They must be of good color, hand picked, and practically free from insect and fungus injury, except those which are necessarily caused in packing.

The grade may be divided according to sizes. The minimum size fruit in a barrel being the standard for that barrel. For example suppose we have a barrel marked "Standard Grade, Minimum Size $2\frac{1}{2}$ Inches." This means that all the fruit in this barrel is at least $2\frac{1}{2}$ inches in transverse diameter, and that it will all pass the inspection for standard grades. We are allowed 10% below these specifications, and still be within the limits of the law;

(3) The barrels which are marked Standard Grade, shall also have marked on them:

- (a) The name of the variety;
- (b) The name of the locality where grown;
- (c) The name of the packer or persons by whose authority the apples were packed and the barrel marked.

It is also permissible to mark on the barrel, "Packed in accordance with the Act of Congress, August 3, 1912." As this law does not go into effect until July 1, 1913, every grower, or dealer in apples should become thoroughly acquainted with the bill. Now understand gentlemen, you do not HAVE to grade, pack, and brand according to this bill unless you wish to mark your fruit "Standard Grade." If you do mark your fruit Standard Grade, and it does not come up to the requirements of this bill, you are liable to a fine of one dollar (\$1.00) per barrel for every barrel that does not come up to the grade and the cost of prosecution.



Treasurer Snythe and the Friday Brothers' "twins" at Summer Meeting.



Roland Morrill and Robert Sherwood inspecting a load of Jonathans in the Sherwood orchard near Watervliet.

LEGUMES FOR COVER CROPS.

L. M. HUTCHINS, FENNVILLE.

(Third Prize Address.)

The place of cover crops in soil improvement has long been recognized. The immense importance of the legumes in this connection is of more recent development. The legumes themselves, that is the individual vetch, clover and alfalfa plants are not in themselves so superior to other cover crops. Their great value lies in their ability to serve as hosts for nitrogen fixing bacteria, the influence of which may readily be seen at a glance at these two samples of alfalfa taken from adjoining plots of three square feet each of sandy loam soil, the one inoculated and the other not. A comparison of the two shows the inoculated specimen to be more than twice the height of the uninoculated and more than ten times the quantity. The explanation of this phenomenal difference of growth under identical conditions is found in the presence of nodules of free nitrogen fixing bacteria on the root hairs of the inoculated specimen. This species of bacteria, known as *Pseudomonas radicola*, is found only on the roots of legumes and is distinctive in possessing the ability to take nitrogen gas from the air in the soil with which to construct its richly nitrogenous cell protoplasm. The organisms live in the interior of the cells of the root hairs, forming galls or tubercles where they act in a symbiotic relation with the host which furnishes sugars and starches to the bacteria, receiving in return the albuminous bodies of dead bacteria, killed by the plant and changed to bacteroids, which are the richest form of plant food and ready for immediate absorption.

After elaborate experimentation and much careful work with this organism, isolating it from the nodules to artificial culture, it was found that it could be grown in pure culture on many kinds of media. However if it is to preserve its nitrogen fixing power it must be grown on nitrogen-free media, since it will take the required amount of that element for forming its protoplasm from the media, if available, in preference to fixing atmospheric nitrogen. Further work with re-inoculating disinfected seeds growing in sterile N-free agar proved conclusively that strains of the organism have developed which require particular species of legumes as hosts. Hence it became necessary to isolate and grown in pure culture organisms from nodules of each of the legumes, the alfalfa organism from nodules on the alfalfa plant, the vetch organism from nodules on the vetch plant and similarly with all.

For commercial use the organism is grown on nitrogen-free agar in small bottles (sample shown). The surface of this media is soon covered with a thick growth of the organism. They are then ready for shipment.

Many methods of distributing the organism in the field have been tried out. Inoculating with soil from an adjoining field known to con-

tain the bacteria has the disadvantages of being expensive, uncertain, uneven and of transferring soil diseases. Also it must be remembered in this connection that each of the legumes requires a *particular strain* of the organism, that used for clover cannot be successfully substituted for that of vetch, for example. The simplest, most efficient and least expensive method is through inoculation of the seed. The cultures just described are sufficient for inoculating one bushel, and may be sent through the mail. The bottle is opened just before using and the culture mixed with water, diluting the numbers. This dilution is then thoroughly mixed with the moistened seed which is then allowed to dry sufficiently to permit its passage through a drill.

Upon germination of the seed the organism is present and immediately infects the young root hairs. The resulting nodules act as "fertilizer factories" on the roots of each plant, carrying the host over periods of otherwise plant starvation when the uninoculated would turn yellow and die upon exhausting the available food in the soil. Inoculation has been observed to make a difference in the case of alfalfa of from no growth at all to seven tons per acre.

In view of these facts the value of the legumes can scarcely be overestimated. They alone must be the salvation of great tracts of poor land where sand burs and brush heaps have been the chief factor in keeping the farm at home. With their use the great problem of soil improvement contemporaneous with increased crop production is largely solved.

THE THREE KINDS OF APPLE TREES.

G. F. LEONARD, HART.

In a consideration of the three kinds of apple trees, viz., the standard or common variety and the two kinds of dwarfs, Paradise and Doucin; I will discuss at some length the dwarfs as compared with the standards.

The question of growing dwarf apples in the commercial orchard is one that has received a great deal of discussion pro and con among commercial fruit growers.

The source of basic information upon this subject is rather limited due to the fact that at the present time the number of dwarf commercial orchards are few in number. However, there has been accomplished considerable work along this line at the Cornell Experiment Station, both at the station proper and through a comparison of results obtained throughout that and other states by the most successful fruit growers.

Dwarf trees as a rule come into bearing earlier than do the standard, this has been found especially so in the apple; they are also supposed to produce larger and handsomer fruit although this latter attribute has never been proven.

Apples at the present time are regularly dwarfed by budding or grafting the desired variety upon Paradise or Doucin stock. The former

produce the smaller earlier bearing variety, while the latter are noted for the growing of a much larger and heavier bearing tree.

A great deal depends upon the pruning of dwarf apple trees, it is essential that they be thoroughly pruned starting at the time they are set, the objects being to stimulate the growth of more fruit-bearing wood, to produce an even distribution of fruit spurs over the entire fruiting surface of the tree, and lastly that the dwarf habit may be maintained. If a normal growth has taken place during the year this growth should be cut back from one-half to two-thirds. Then on a thorough and consistent pruning depends the ultimate success of growing dwarfs.

In a commercial consideration of the growing of dwarfs as compared with standards we have these questions to answer: First, Do they produce enough fruit to insure a satisfactory profit? Secondly, Can they be used economically as fillers between the larger trees? And finally, do they require more or less care than the average standard tree?

These questions are answered in the main by reference to the work accomplished at the Cornell Experiment Station, and by such eminent Horticulturists as Werder and Thomas when they say, that dwarf trees will not bear fruit regularly unless especial care is bestowed upon them, as they are very unstable in habits of growth and fruitfulness. This uncertainty of bearing and the requirement of especial care practically bars them from being grown in competition with the standard variety in a commercial orchard.

TOP WORKING ORCHARD TREES.

T. F. BAKER, GRAND HAVEN.

The top working of orchard trees is becoming more widely practiced by up-to-date scientific orchardists every year. Many orchards, especially those planted before the era of scientific horticulture in Michigan, are found unsuitable to the climate and other environmental conditions about them. To take out these old orchards and rejuvenate them with young suitable trees would require much patience and capital; to leave the trees unchanged means the continuance of an unproductive investment. Here the system of top working lends the orchardist a glad hand. By inserting buds or scions in the tops of his old trees, he can within a few years, completely change the fruit and character of his orchard. Again top working is practiced in trees of self sterile varieties to insure cross pollination. It is also used in reforming tops of trees like the peach, and is especially useful in testing out new varieties by bringing them into early bearing by working them into bearing trees. Furthermore, by selecting suitable stocks or scions, the danger from sun-scald may be lessened, vigor may be modified, fruitfulness may be hastened, insect injuries decreased, and last, but not least, desirable characteristics may be perpetuated.

Scions inserted in old trees bear at an early age, but it is uncertain whether the fruiting of scions grafted on a young tree is accelerated.

Young trees top-worked with buds or scions from bearing trees will bear a year or two earlier than trees propagated with buds from nursery stock.

From this we see that top-working is practical on both young and old trees. On young trees budding, whip and tongue, cleft and branch grafting are used. All the processes of grafting involve the insertion of a scion on the stock so that the growing parts of both are in contact. The operation is performed in the spring just before the foliage starts to push forth though it may be done a little earlier or later.

The process of budding consists in the insertion of a bud attached to a piece of bark into a slit or matrix in the stock. Shield budding is most commonly practiced, and is so named from the shape of the bud with its adherent back. The best time for budding is early September. The young tree may be either body or branch budded. In the latter case the buds are placed several inches from the stem so that in case the fall bud dies another may be set the following June or September. As soon as the bud commences growth in the spring, the branch is cut off at a distance of about 2 inches above the bud. This to prevent the new shoot from blowing out. After a few weeks the stub is cut off close to the shoot, so it may heal over during that season. It is sometimes advisable to leave the water sprouts from a June budded tree or limb until the following spring as this checks the growth of the new shoot at the same time giving it a better chance to harden. On the other hand, fall budded branches demand the removal of water sprouts three or four times during the following season to prevent smothering.

In working new varieties on old trees the cleft graft is invariably used. The process consists in the splitting of the limb longitudinally and the insertion of 2 scions one on each end of the slit so that the growing portions of scion and stock are in contact with each other. This is done in early spring on limbs not exceeding 3 inches in diameter as those larger than this are not likely to heal over. Both the cleft in the stock and the tips of the scions are carefully waxed after the operation. Both scions are allowed to grow for several weeks during the following season, and then the weaker is selected and cut off, throwing the total vitality into the one shoot. It is best not to try to remove the entire top in a single year, as it is at least an exhaustive process, and should therefore be spread over a period of a few years. Water sprouts should be removed in June; it is also best to paint the larger wounds with thick lead, to prevent the entrance of water, spores of fungus diseases and bacteria.

A good, well known grafting wax is compounded as follows:

- 1 part tallow.
- 2 parts beeswax.
- 4 parts resin.

This is melted, poured into a pan of water and pulled like molasses candy until light colored. It may be kept indefinitely by wrapping in oiled paper and placing it in water.

THE APPLE PACKAGE—BOXES OR BARRELS.

L. C. CAREY, CHARLEVOIX.

Shall the box supplant the barrel as the standard apple package? This question has confronted the eastern apple growers almost continuously since western apples in boxes began to compete with eastern barrel-packed apples some fifteen years ago. It has nettled the easterner to see a bushel box of Washington apples sell for \$3.00 while his own 3 bushel barrel of the same variety brought only \$4.00 on the same market. Knowing that a considerable difference in quality was all in favor of his own fruit the easterner has been inclined to attribute the discrimination in price to the superiority of the box type of package over barrels, while in reality the difference was due—not to type of package—but rather to the superior methods and skill of the western grower in grading and packing. Their great distance from market and high consequent freight rates necessitated a package that would pack tighter in cars. Boxes have that advantage over barrels. Moreover, they knew that inferior fruit could not possibly pay the high transportation charges, compete with eastern apples and still return a profit. Consequently, they began a scheme of growing—so intensive—that today an orchard is considered unsuccessful that produces less than 90% fancy fruit. Attendant with this growing scheme—there has been developed a skill in grading and packing—nearly 100% efficient. Couple with this the fact that the west lacks the hardwood material for making barrels, and does possess ideal wood for boxes, and you have the reasons for the distinctive western apple box, *in which uniformity is imperative.*

Contrast this situation, if you will, to that in the east, where, it is safe to say, less than 30% of the total apple crop is fancy or No. 1, because of less intensive, cultural methods, where an inherent habit of using “facers” and “fillers” still persists, resulting in more or less careless grading and packing, where transportation rates are comparatively minor considerations and where there is barrel material a plenty, and scarcely no box wood, if any, and you have the reasons for the characteristic eastern apple barrel, *in which no uniformity is required* and also the reasons for the eight failures out of every ten attempts to pack exclusively in boxes east of the Mississippi.

Each type of package is thus seen to be the result of existing conditions, each perfectly adapted to the style of fruit produced and to the market they expect to supply; and the discriminating prices are paid for the superior skill and enterprise of the western grower, rather than for type of package used.

So much for history; as to the future, the trend, following the tendency of the times in other commodities, is all toward the smaller package. But so long as there exists the great middle class of people and the relatively small wealthy class, there will be need of the two types of packages with their respective “shuffle” and “speciaized” pack. The

great mass of people cannot afford to pay fancy prices for fancy packing. What they want is quantity combined with fair quality. The barrel package supplies that demand and will for many years to come.

The easterner should, therefore, be conservative on the subject of box apple packing. The western methods of growing and packing are more expensive than the eastern scheme, and the net returns are scarcely, if any, greater, bushel for bushel. And so, although the drift is all toward the box the easterner should not begin their use until he is fully prepared, and that is only when he can procure boxes as cheaply as barrels, bushel for bushel, when he can produce at least 90% fancy or No. 1 fruit, in large quantities, not only one year, but year after year; when he can command skilled and experienced packers and when he has a market educated to that style of package. At present less than one grower in ten—east of the Mississippi—meets these conditions.

PEDIGREE TREES.

C. C. CARSTENS, MICHIGAN CITY, INDIANA.

"Breed is more than feed." This expression applies to all domesticated animals, and a horse, a cow, a pig, or a dog is valued according to its pedigree.

By the term pedigree we refer to the genealogy, the descent or in simpler terms, a pedigree is the record of the line of ancestors. The pure races of animals which we have today were produced by repeated selection or crossing of the ancestors of our present day animals. The record of these ancestors is the pedigree.

In 1862 pedigree wheat was produced, bred upon the same principle of repeated selection, the same principle which has produced pure races of animals.

Now the question arises; is it important that we know the pedigrees of plants, propagated from buds, scions, cuttings and off-shoots of plants, as it is in the case of men, animals and seeds?

The pedigree idea rests upon the most important principle of plant breeding—that of selection. We know that no two trees in any orchard are exactly alike, either in the amount of fruit which they bear or in their vigor and habit of growth. Some are uniformly productive and some are uniformly unproductive. We know too that scions or buds tend to reproduce the characters of the trees from which they are taken. If all other plants are being improved by selection, and the improvements are handed down to their offspring, why can we not improve our varieties of fruits by selection of scions, buds and cuttings?

Before we go further we must first draw a clear line between plants propagated from buds and scions and those grown from seeds. In the case of seeds we have the offspring inheriting a combination of definite characters of two parents. Since these combinations of characters handed down from parents to children are never the same we find that individual seedlings from the same two plants may vary greatly.

On the other hand a bud or scion is literally a "chip off the old block," and we find it to contain the characters of only one plant, the plant from which it was taken.

A concrete example is found in the selection of cuttings from a chosen tree in the orchard and propagating trees from these right in the same orchard and under similar conditions. It shows that even if this is done for several succeeding generations, that the last trees will produce no better fruit than the original tree in the orchard.

We cannot breed up by this method of selection of cuttings, a type of Northern Spy for example that had in addition to all the ordinary Spy qualities, the character of resistance to scab, or a thicker, tougher skin to improve its shipping qualities.

I have here a Northern Spy produced on a tree which was grown from a scion taken from the original Spy tree at E. Bloomfield, New York. It is therefore only one generation removed from the original Spy. This tree was not sprayed this year and scabs shows up on this specimen. In the other hand I have a Spy from a tree that has no pedigree because through several generations the scions have been selected indiscriminately from among Spy trees. Holding them up for comparison shows no differences by which you could distinguish one from the other.

BALDWIN FRUIT SPOT.

W. S. FIELDS, BUFFALO, N. Y.

The Baldwin Fruit Spot is a disease, so-called perhaps because it occurs on this variety more than on any other. But the specimens which I have in my hand are Northern Spies affected with this disease.

This fruit spot is called by various names and is confused with "Sooty Spot" and "Brown Spot," both of which are fungus diseases. The disease appears on the surface of the apple in the form of small brown spots, varying in diameter from one-sixteenth to one-eighth of an inch. The spots are slightly sunken or depressed, so that the surface has a pitted appearance. You will note that the spots are not uniformly distributed over the surface and are considerably more numerous towards the apical portion than towards the cavity of the fruit. In these specimens the cavity is practically free of the spots.

The spots extend into the flesh of the apple but a short distance, about as much as the diameter of the spot. Then the damage to the apple is principally one of disfigurement but we all know that a number one apple must be free from blemishes and so an apple affected with this disease, no matter how perfect otherwise, will be graded as a number two or three. It has been observed that these spots are not confined to the surface but may occur at any depth in the flesh and will increase in number in cold storage. The browned tissue may have a slightly bitter flavor in the older spots but this bitterness is not a constant factor.

The cause of this disease is unknown thus far and careful observations in the laboratory conclude that neither fungi nor bacteria can be

assigned as the cause of the spot. The disease is widespread both in Europe and the United States. The variety pre-eminently subject to it in the northeastern part of the U. S. is the Baldwin. Prof. Craig of Ottawa, Canada, reports the spot as occurring on the Baldwin, Canada Red, Northern Spy, Seek-No-Further, Tolman Sweet, Ben Davis, Fameuse and others.

Wortmann, a German investigator found that starch is present often in considerable quantity, in the brown, spongy tissue while the surrounding healthy tissue is almost, if not wholly destitute of starch. It is believed that upon death of the cells their activities ceased and the transformation of starch into sugar was arrested. This theory accounts for the absence of starch from late formed spots. Several other investigators of this disease were, Sewart of the Geneva Experiment Station, Craig of Ottawa, Canada, Lamson of the New Hampshire Station and others.

NEEDS OF MICHIGAN HORTICULTURE.

F. L. GRANGER, LEXINGTON.

"Michigan as a fruit state is a back number." Do you believe this? Is that putting it too strong? Anyway that is the essence of a prominent two-column article in a national fruit magazine of over one hundred thousand circulation. And the men who were responsible for that expression are, I suspect, in this room at this time. Furthermore, I believe that they were more than half-justified in making the statement.

Michigan has always had the reputation of being a conservative state, in horticulture as in politics formerly, and that conservatism has held sway to such a degree that it has developed a flare-back and almost dismembered its own supporters. We have been conservative until that word has developed a meaning almost criminal.

But I believe that an awakening is at hand and that this splendid Apple Show is the inspiration for greater things in the future. You all realize that fruit-growing, as an industry, is growing more highly competitive every day. The next five years will witness greater strides than the past twenty-five have. For instance, do you know that in the Inland Empire of the West fifteen million apple trees will be in bearing in 1915? If 25% of these produce a crop there will be 25 thousand cars of choice western fruit on the market in that year. Further, do you realize that the men marketing that crop have the advantage of 10 years of progress and thousands of dollars in advertising their apples and creating a market for their crop? Sunset Magazine has spent 35 thousand dollars in the past six months, telling of the West and its products in all the big magazines of the country. Every railroad and the fruit organizations of the Pacific Northwest have spent other thousands advertising the land of the "Big Red Apple." Lastly, the West has the finest fruit paper in the United States, which has never paid a dollar in dividends, simply because every profit has gone



J. E. Merritt of Manistee and Horace Sessions of Shelby inspecting a bent-handle, wide spike tooth harrow for cultivating the famous Sessions peach orchard.



H. L. Brown of Parma and his orchard of 40 acres of Baldwins and 20 acres of Starks and mixed varieties.



Senior students from Horticultural Dept. of Michigan Agricultural College visiting farm of Mr. and Mrs. T. A. Farrand of Eaton Rapids.

back into the paper to advertise the West and its apples. All this is going to be a mighty advantage in selling apples when apples are a drug on the *market* and we must stand up and compete with them for *that market* or get out of business. My friends, you've got to "go some."

The first thing necessary is organization in every fruit community.

Second. Michigan needs a fruit paper devoted to the fruit interests of the state and boosting first, last and all the time for Michigan horticulture.

Third. Michigan needs a land boom which will accomplish two ends: 1st. Place before the entire country the possibilities of this most favored state for fruit-growing and; 2nd. Rid the state of its back-number farmers and fruit-growers as far as possible, incorporate progressive spirit in their place and give Michigan a fighting chance for place in commercial horticulture. This state lacks nothing in the way of soil, climate and markets to make it the greatest fruit state in the union. But Michigan does lack men. Men with big ideas and with a fighting, boosting, spirit for Michigan. We have a few of them and they are making good just as far as it is possible under the limiting conditions set by the hundreds of others who never had a live idea in their lives nor the backbone to push that idea if they did get one.

Lastly, in conjunction with the above there must be an effective, judicious, persistent campaign of advertising of Michigan fruit, particularly Michigan apples. One year ago, advertising Michigan apples under the then present packing conditions would have been useless expenditure of money. Now the whole solution lies in your hands. Beginning July, 1913, Michigan apples standardized under the Sulzer Law can go out to show the West, the East and the South what real apples are and create a demand for more. In conclusion we must admit that Providence and an insurgent Congress have been very kind to Michigan, let's make the most of it.

THE HISTORY OF THE AMERICAN GRAPE.

A. H. HENDRICKSON, GRAND RAPIDS.

Nowhere in the history of American fruit-growing is there a story as romantic or as fascinating as the history of the American Grape. It is a story full of vicissitudes, vain endeavors, and repeated failures which were at last superseded by complete success. From the first America was known as a land of vines. It is said that the old Norse Viking "Leif-the-Lucky" called New England "Vineland" as early as the year 1000. The early colonists were filled with wonder at the great profusion of grape vines all over the new country, and they had visions of vine-clad hills and terraces that would rival those of France and Germany.

The early legislative assemblies made vine growing compulsory, and large sums of money were spent importing vines and scions of the

Vinifera grape. Vine dressers were brought over from Germany to care for the vineyards and old country methods were imitated as closely as possible. These old world people knew nothing about the *Phylloxera* or the Mildews. In spite of all care and money lavished upon the vineyards, the result was always the same—failure.

Two of the most famous attempts to grow the European grape in America were made by John J. Dufour and Nicholas Longworth. Dufour with a colony of Swiss settlers planted several extensive vineyards in Kentucky. These flourished a few short years and died. Longworth spent 30 years of his life and thousands of dollars in money in a vain effort to grow the European grape in Ohio. His writings on "Grape Culture," in which he recorded his ideas and experiences, remain as a standard reference to this day.

Thomas Jefferson advised growing the native varieties without further delay, but it was not until the opening of the nineteenth century that any attention was paid to the improvement of the American varieties. William Prince of the famous Prince Nurseries of Long Island experimented with the European grapes for over a half century, and then gave his attention to improving American kinds. He did more towards creating an interest in the native grapes than any other one man. The first commercial vineyards were set out by a colony of Germans near York, Penn. The industry grew very slowly and very little was heard of it for the next quarter of a century.

In 1852 the Concord was introduced by E. W. Bull of Cambridge, Mass. The advent of this great variety marked the beginning of American grape growing east of the Rocky Mountains. Its size, hardiness, productiveness, and shipping qualities soon gained for it the foremost rank among the grapes. Horace Greeley called it the "grape for the millions." Modern methods of grape growing had their beginning with the Concord. From it have descended such well-known varieties as the Worden, Moore's Early, Isabella and Pocklington. From 1852 to 1880 marked the boom period of American grape culture in eastern United States. Since that time, due to competition with California grapes, the acreage has increased more slowly.

In 1859 there were 6,000 acres of grapes east of the Mississippi, in 1900 there were 240,000 acres, an increase of near 8,000 acres per year. In 1850 there were no varieties that will go down in history, today we have such wonderful varieties as the Concord, Worden, Niagara and Delaware.

Now, if in less than 60 years we have brought up grapes like the Concord and Worden from the little sour Fox Grape of our northern woods, how may they yet be improved by modern methods of plant breeding? What could we have had if the first 200 years of our early horticulture had not been wasted in a useless endeavor to grow the Vinifera? And what are the vast possibilities of American Grape Culture lying before us as an unopened book?

APPLE BREEDING.

R. E. LOREE, EAST LANSING.

The subject of apple breeding should be of interest to every Michigan apple grower, and, I am sure that it is worthy of our serious consideration. A few facts may be of interest to show what has been accomplished in this particular branch of horticulture.

In the "Apples of New York" 698 varieties are described. Of all these, there is only one of which both male and female parent is known: two have one parent given and the other one guessed; four are said to be bud sports or mutations; the female or seed parent is given for 39 varieties; and 71 are chance seedlings. No origin is known for the remaining 517 varieties.

From these facts we may draw the following conclusions: First, that there has been no systematic effort to improve varieties of apples; second, that improvement has been brought about by the introduction of new varieties; third, that most of these varieties have originated as chance seedlings. Thousands of seeds have been planted, with the idea that, perhaps, at least one might develop a tree and fruit of superior quality, hardiness and habit of growth.

Now it seems to me that such methods are entirely too slipshod; to say the least they are unscientific. Why can we not eliminate this element of chance and uncertainty? I believe we can. I believe that any radical improvement will be brought about only by the crossing of desirable varieties. This, of course, involves the artificial pollination of the apple blossom. The method is simple. Buds are selected on both male and female parent, selecting those which have not yet opened. The stamens are removed from the bud of the female parent, care being taken that none of the anthers are dehiscent; it is then covered with a paper sack. In a day or two, or when the stigma is receptive, the sack is removed, and pollen from the flower of the male parent is applied to the stigma. The sack is then replaced and allowed to remain until seeds have formed; later the paper sack is replaced by a cloth sack which is allowed to remain until harvest time. Much care should be exercised during the whole operation to exclude all foreign pollen. The fruit resulting from this cross will not differ from any other fruit on the tree used as female parent, but the fruit grown from the seeds resulting from the cross will be entirely different in character.

About twelve years ago an experiment was started at the Experiment Station of Geneva, New York. A large number of crosses were made. They found that, contrary to popular opinion, seedling apples do not revert to the wild type; that certain varieties are prepotent as regards certain characters, or that these characters are carried over in the fruit resulting from the cross. They also found that the seedlings were much more vigorous, even when crowded in the nursery row, than the common seedlings which were not crowded.

Probably most of our valuable varieties have resulted from accidental

crossing in nature, but if we know the characters which will carry over, it should be easy to select parents and unite given characters to form a new and superior combination without the waste of time necessary in growing so many seedlings. Results already obtained show that improvement can be made by crossing varieties having these desirable dominant characters, and I suggest this method of apple breeding as a means by which varieties of apples may be "bred up" or improved much more quickly, and with more certainty, in the future than in the past. To be sure, the work lies largely in the hands of the experiment stations where the problem of time and funds is not so great as with the individual, but I do not think it is out of the realm of the individual fruit grower, providing sufficient care is exercised in the work.

In conclusion, let me say that we must improve our apples for Michigan conditions, and I know of no one better fitted for the work than the Michigan horticulturist who thoroughly understands these conditions. Improved varieties brought to us from other localities may prove to be of little value when brought under the influence of a new environment, and it is doubtful whether bud selection or the use of "pedigreed trees" will effect any improvement. There is, however, much promise of improvement in apple breeding, and by close application of the new laws of breeding which have been discovered we may expect the production of new varieties which are far superior in many respects to any which are now grown.

VARIETIES FOR THE COMMERCIAL PEACH ORCHARD.

ALBERT J. OLNEY, REEMAN.

In the selection of varieties for the commercial peach orchard there are a few factors upon which the success or failure of an orchard depend. A study of the conditions in Michigan show that orchard after orchard is set every spring with poor varieties.

First of all we desire to raise a peach for which there is a demand. A peach which is large, well colored and attractive in appearance. A white peach or a cling stone is not wanted in our markets.

The majority of our peaches are sold in the large cities like Chicago, Milwaukee, Cincinnati or Pittsburg. It is highly desirable therefore, to have a peach which will ship well.

Again productiveness and hardiness are important considerations. Ten years ago my father set out 200 Early Crawford trees and as yet we have never had a full crop, while varieties on either side have borne heavy crops every year with the exception of the present.

We also wish to have varieties which will ripen in as close succession as possible because the labor problem is considerably lessened by having steady employment during the whole picking season.

The first peach I shall discuss is the Elberta. This variety is so well known that a detailed description is unnecessary at this time. Fruit growers and buyers too, like the Elberta because it is a large

peach and one of the best in shipping qualities. The tree is very subject to the leaf curl but the early spray before the buds swell will control that. So we consider this fault of minor importance.

The Engles Mammoth I would place very high in the list, at least for some localities. They are better in quality than the Elberta and we have found them more productive, producing almost annual crops. There are, however, a few faults in this variety which must not be overlooked. In some localities growers have complained that the Engles do not color up well but we have never had that trouble. They are a little tender and must be handled very carefully and picked right on time. Consequently the facilities for getting to market would be an important consideration, but if they can be placed in an iced car as soon as they are picked they will get into Chicago or Pittsburg in fine condition.

The Kalamazoo ranks very close to the Engles, is almost as productive and similar in size and appearance. We like them too because they follow the Engles so closely in ripening.

The Oceana, a comparatively new peach is coming into a great deal of prominence in some sections. They are a fine large peach ripening close to the Engles and good shippers. They are very hardy. An orchard of 1,000 five-year-old trees in Nawaygo county had about 50% of a crop this year while other varieties such as Early St. John, Triumph, Elberta and Crawford had only here and there a scattering peach.

There are many other varieties of commercial value that deserve mention but time will not permit me to do that. We want just as few of the best varieties as we can find and still cover the desired picking season. We want enough of each variety so that we can handle the fruit economically.

THE CODLING MOTH IN THE PACKING HOUSE.

R. R. PAILTHORP, PETOSKEY.

Thousands of dollars are lost annually by the fruit growers of Michigan through their neglect and carelessness in fumigating their storage and packing houses. The codling moth, the most serious insect enemy of the apple, winters over in such sheltered places, as well as under the bark on the trees.

The larvae or apple worm crawls out of the apple in storage, and having found a suitable place, weaves about itself a cocoon. Towards spring the larvae changes to the pupal stage. The pupae is about half an inch long, varying according to age from a yellow to a brown color, and changing to a bronze hue just before the moth is to emerge. These cocoons are generally spun up under loose boards or under old rubbish. When weather conditions are right, the moth comes out of the cocoon, flies about and lays its eggs throughout the orchard. The eggs soon hatch out into larvae, which enter the apples.

Last summer I found apples badly infected with the codling moth

larvae a week before the time to spray. I knew it was not time to spray as I was carrying on an experiment in the orchard to determine the flight of the moth.

I found the cause of this early infection in the packing house. To my surprise, the crates which were stored there over winter, were covered with cocoons of the codling moth. Upon entering and jarring the crates a cloud of moths blew about and out through the doors to lay their eggs in the orchard. The majority of the moths had flown at this time. I made an estimate of the number of cocoons and found that no less than 4,000,000 larvae were hatched out from this packing house.

You all know that a plant grown in a green house or some protected place, will come to maturity earlier in the spring than one grown out of door. The same was true of these moths that had been reared in the packing house. They hatched out earlier, on account of the warmer and more sheltered conditions under which they lived. As a result, the orchard was full of moths before a spray had been applied. Reasoning along the same line we can say, those cocoons spun up in cellars or storage houses would hatch out later than those in the orchard, because of the cold and dampness. This brood would infect the orchard later in the year than those hatching out in the orchard.

Sprays are recommended to be applied at certain times. This time is the period when the larvae are present from eggs laid from moths reared under orchard conditions. Now we do not spray for this early brood which hatches out in the packing house or a later brood which hatches out in storage cellars. Instead, we resort to a simple method of fumigation or burning of sulphur. This fumigation should be done early in the spring before the approach of warm weather. Where building can be closed up tightly, 5 pounds of sulphur to 1,000 cu. ft. of air space is sufficient, but in more open houses where every crack cannot be sealed up 10 pounds or even more should be used.

In conclusion, I would advise every grower to acquaint himself with the cocoon and moth and be able to detect it. If he is not sure of its presence, fumigate, as an ounce of prevention is worth a pound of cure.

THINNING FRUIT.

I. J. PICKFORD, EAST LANSING.

Thinning fruit on the tree is an important operation in the scientific management of orchards, and one that Michigan horticulturists should practice more extensively. We want to establish in the mind of the markets and in every consumer the idea that Michigan stands for quality. Let us assist nature in her effort to put Michigan on top. Fruit growers, however, are hard headed business men and they will not go to the expense of thinning for an idealistic effect only. There must be money in the process before they will proceed and an examination shows its value for more reasons than one.

Possibly the foremost factor is protection to the tree. No one wants

a tree that it takes years to secure and that money will not replace, broken down by overloading. Nor does one want to go to the expense of propping, an inefficient resort at its best. For example Mr. O. K. White thinned a Hubbardston apple tree at Bear Lake this last season. He took off over 1,100 apples although several people thought that the tree could have matured the whole load. The tree next to it and similar in load was left. This fall the unthinned tree had lost a large branch by breaking down. This season has made you all familiar with such danger.

Let us take as next in importance the size, color and quality of the fruit. Any amount of bulletins bear out the common knowledge that thinning will increase the size of the individual fruits without making any decrease in the total bulk. Further this allows more sunlight to get in, meaning more color. It allows more thorough spraying meaning higher quality in every way. Here is what one Michigan man did. Mr. C. B. Cook, of Owosso, harvested last year over 60 bushels of choice Snows from one tree. These apples sold in Saginaw for \$6.00 per barrel. Besides other care Mr. Cook had two men put in $1\frac{1}{2}$ days thinning the fruit on this tree for it had set several times over a reasonable load. Of course the thinning paid though, that is, more than the cost for the usual run of trees.

Then there is the ease of picking and packing choice, even-sized fruit. It costs less to get rid of the extra fruits at thinning time as they are simply dropped. The total bulk at harvest time is the same while the quality is much better hence the better price. This summer on the W. M. Pratt & Sons farm at Benton Harbor, I counted Red Astrachan apples as actually graded into number ones and twos. In a half bushel of ones were 60 apples. In a half bushel of twos were 130 apples or over twice as many individual fruits in an equal bulk. The 130 apples are of course harder on the tree than the 60 for they will not be so advantageously placed as well as meaning over twice as many seeds to mature with their attendant drain of vitality.

As a last point take the matter of annual bearing. It is probably an error to place much confidence in the idea that thinning is a sure promoter of annual bearing. Some varieties are habitually inclined to bear only every other year and it is doubtful if thinning will overcome this tendency.

Beach of the Geneva Station declares that no benefit along this line was noticed with Baldwins. Many horticulturists, however, believe that thinning is an inducement toward annual bearing and it is a reasonable supposition, especially with those varieties of apples not inherently bi-annual bearers, and also with peaches, pears and plums. Additional strength in the tree in the fall ought to insure fruit buds every year and ones of good vitality.

The methods of thinning are quite simple. Much can be accomplished by judicious pruning, leaving the right amount of bearing wood to each branch. When necessary to hand thin, leave no two fruits touching. Thin peaches to about 4 inches apart and apples much the same; at least only one apple on a spur. Plums and pears are thinned accordingly, always depending on the size of the variety and the condition of the tree. As to time, do it early in the season right following the

natural drop. To summarize then to secure protection to the tree from mechanical injury, to gain in size, color and general quality of fruit, to assist in the ease and speed of picking and packing, to offer a possible aid towards annual bearing and incidentally to boost Michigan horticulture at a profit to everyone concerned.

BUSINESS PRINCIPLES IN HORTICULTURE.

H. A. SCHUYLER, ADRIAN.

The application of business principles in any concern is limited to their practical value. It is doubtful if any one can afford to practice methods that are not of practical value.

In locating for horticulture, several questions will appear. Can one afford to sacrifice easy access to market for good soil, or will it be better to sacrifice the good soil for poorer soil closer to market? Generally a good site and market are to be desired. The fruit grower on a small place has many advantages over one on a larger area. Maximum area only should be under operation affording an amount of work such as pruning, cultivating, spraying, etc., that can be done well and on time. If the work is not done on time there is no use doing it at all.

The use of fertilizers is also a vital question. How far can it be used and allow for profit? There are many instances where an added amount of fertilizer adds to the yield of fruit, but the extra amount of fruit does not begin to pay for the extra application and work. The best fertilizers for use can only be ascertained by practical analysis. A benefit in one case may be a damage in another.

Again it is questionable if other than the best trees shall be set. A cheaper grade might do as well but the risk is too great. Only varieties suited for the location should be set, and not too many of these.

Tillage is the basis of success in horticulture and therefore a vital factor. However there are some important things to consider in this operation. 1. The implements to use. There are some which will keep twice as much ground in a good state of cultivation as others with the same amount of energy. Also if as good results can be obtained with five operations as with ten, why do the extra work?

The same business methods apply in all parts of the work, thinning, picking, packing and marketing.

In the end the fruit should be put on the market in the best possible shape, a finished product and one of which to be proud.

Observation shows us that the merchant and dealer have found the way to success only by strict application of principles beneficial to their business and the horticulturist is finding the same true.

Let us not stop with the methods now in vogue, but let us put forward every effort to make Michigan a leading state in horticulture.



Elberta peach orchard of Paul Rose, near Elberta in Benzie county.

WEDNESDAY AFTERNOON SESSION.

The Chairman—Before we proceed with the regular program of the afternoon, I would like to make an announcement of the awards made in the Speaking Contest. They are as follows:

First Prize, H. F. Miners, St. Joseph.

Second Prize, I. J. Woodin, Owosso.

Third Prize, L. H. Hutchins, Fennville.

Secretary Bassett—I wish to say a few words in regard to our co-operative buying of supplies. The Executive Board want to know what to do. I desire to submit to you a proposition that I think is better than what we have had in the past. You know we have heretofore secured bids from different companies for our supplies of spraying material, fertilizers, etc., and we have found that many firms did not care to bid—indeed would not put in a bid—they say that they do not care to make a bid and then have us publish that bid, and then other houses, when they get our prices, make a price below ours, so that you are able in this way to get your supplies from them cheaper than through the Association. It is my belief that the proper way for us to buy goods is to co-operate—pool our orders, and allow the executive committee to go out into the field and give the orders to the firm that makes the lowest cash price. Under the old system, the plan was not a success, especially in New York and several other states, and with us, it has not been as satisfactory as we had hoped when we started in with it. Then in getting in such large quantities, we can get the very lowest cash price. I think this should be the policy the coming year, and ask for a favorable action on the matter.

A member: How would you do—check out, or trust out, or how would you do?

Mr. Bassett—Early in the season you know how much material you will use. You figure that you want so many tons of sulphur, or so much this or that, and let the ones who have the buying know this, and then when that report is furnished, the orders can all be pooled, and price secured, and you will be notified of this, and then we will expect the cash to be forthcoming to pay for it. There will be no trusting business.

On motion it was agreed that the co-operative buying be left with the Executive Board. Carried.

Mr. Smythe—It may be out of order, but I would like to suggest, as the Society as a whole may not be aware of it, that during the past year we have lost two very valuable members, in the persons of O. S. Bristol, and S. B. Hartman. I would suggest that this body take action authorizing that resolutions of condolence be sent to the families of these two members.

Mr. Bassett—While the Executive Board has already done that as a Board, it would be eminently proper that this body take some action, and I move that it be taken. Carried.

ELECTION OF OFFICERS.

President—J. Pomeroy Munson, Grand Rapids.
Secretary—Charles E. Bassett, Fennville.
Treasurer—R. A. Smythe, Benton Harbor.

MEMBERS OF EXECUTIVE COMMITTEE.

Paul Rose, South Frankfort, three years.
W. F. Hawkhurst, Saline, one year.
F. A. Wilkin, South Haven, one year.

REPORT OF TREASURER.

J. Satterlee, Treasurer, in account with Michigan State Horticultural Society.

1911		Dr.	Cr.
Dec. 6	To balance on hand at time of annual meeting.....	\$342 53	
Dec. 22	To C. E. Bassett, cash from annual memberships.....	99 06	
Dec. 22	By C. E. Bassett, expenses students judging and oratorical contest, annual meeting, etc.....		\$99 06
Dec. 16	To Charles W. Garfield, Treasurer of Lyon Fund, balance belonging to general fund.....	246 11	
Dec. 22	By checks drawn for expenses to annual meeting, etc:		
Dec. 22	By checks, Hiram Chambers, Lansing—Librarian.....		25 00
Dec. 22	By check, W. E. Cornell, Battle Creek—Stenographer....		63 50
Dec. 22	By checks, C. E. Campbell, Kalamazoo—R. R. 9 Delegate		8 08
Dec. 22	By checks, L. E. Hall, Ionia—Delegate.....		13 14
Dec. 22	By check, D. H. Scott, Northport—Delegate.....		14 86
Dec. 22	By check, Frank E. Ford, Eaton Rapids—Delegate.....		12 84
Dec. 22	By check, T. A. Farrand, Eaton Rapids—President.....		17 19
Dec. 22	By check, George Friday, Coloma—Delegate.....		12 86
Dec. 22	By check, O. S. Bristol, Almont—Vice President.....		18 26
Dec. 22	By check, Chas. A. Pratt, Benton Harbor—Ex. Board....		16 83
Dec. 22	By check, Chas. F. Hale—Grand Rapids—Ex. Board....		9 89
Dec. 22	By check, Geo. Chatfield, South Haven—Delegate.....		12 70
Dec. 22	By check, J. P. Munson, Grand Rapids—Ex. Board.....		10 14
Dec. 22	By check, R. A. Smythe, Benton Harbor—Delegate.....		15 83
Dec. 22	By check, F. H. Hemstreet, Belleair—Delegate.....		8 60
Dec. 22	By check, James Satterlee, Lansing—Treasurer.....		11 97
Dec. 22	By check, Frank A. Wilkin, South Haven—Delegate.....		12 72
Dec. 22	By check, A. M. Bullock, Lapeer.....		12 82
Dec. 22	By check, Edward Hutchins, Fennville—Ex. Board.....		12 76
Dec. 22	By check, T. A. Farrand, Eaton Rapids—Expenses.....		4 49
1912			
Apr. 30	By check, E. O. Ladd, Old Mission—Delegate.....		6 66
Apr. 30	By check, Paul Rose, South Frankfort—Delegate.....		13 21
Apr. 30	By check, Henry Ewald, Eaton Rapids—Delegate.....		13 13
Oct. 21	To Charles W. Garfield, Treasurer Lyon Fund, balance due general fund.....	714 86	
			\$446 54
Nov. 2	By balance on hand in City Nat'l Bank, Lansing.....		956 02
	Totals.....	\$1,402 56	\$1,402 56

Nov. 4. Balance drawn from City National Bank and draft for \$956.02 sent to Charles W. Garfield by suggestion of Secretary Bassett to be turned over to new treasurer.

October 21, 1912.

Mr. James Satterlee, Treasurer of the Michigan State Horticultural Society, Lansing, Mich.:

My Dear Sir—Owing to the early date of the annual meeting of the State Horticultural Society, I herewith hand you the condition of the Lyon Memorial Fund with a list of the transactions for the year ending today, so you will have ample opportunity to compile your report for the meeting which will be held in Grand Rapids, November 13. First, I will give you a list of the assets as they stand today:

One Morrill Bond	\$1,000 00
Accrued Interest	60 00
Worden Preferred Stock	2,000 00
Three Greenhouse Bonds	1,500 00
Detroit Gas Bond	1,000 00
Dykema Note	355 00
Savannah Bond	500 00
Cash in Bank	2,399 86
	<hr/>
	\$8,814 86
Lyon Fund	\$7,600 00
Life Membership Fund.....	500 00
	<hr/>
Making a total of	\$8,100 00
	<hr/>
Leaving a balance of	\$714 86

I herewith enclose check for this amount.

The following is a list of the transactions as shown by our Grand Rapids Savings Bank book since my last report December 4th, 1911.

Cash on hand Dec. 4, 1911	\$1,456 15
Dec. 13th, paid Satterlee	\$746 11
Dec. 13th, Life Membership from Satterlee...	500 00
Jan. 1st, Bank Interest	9 12
Jan. 1st, Investment	500 00
Feb. 26th, Rent from M. A. C.	137 50
April 6th, Drummond Bond & Interest	511 08
June 1st, Worden Interest	70 00
July 1st, Bank Interest	15 96
July 6th, Savannah Interest	25 00
July 6th, Detroit Interest	50 00
July 6th, Concord Interest	8 75
Oct. 12th, Dykema Interest	10 66
Oct. 12th, Greenhouse Interest	68 00
Oct. 18th, M. A. C. Rent	275 00
Oct. 21st Concord Bond & Int.	508 75
Oct. 21st, Cash in Bank	2,399 86

By the transactions you will see that on December the thirteenth of last year we straightened out matters leaving the Lyon Fund at \$7,600.00 and the Life Membership Fund at \$500.00, so that the permanent fund left in my hands as Treasurer is \$8,100.00.

The income of which goes to the Society for its current expense. This makes a clean record and I will find some investment very soon for the amount that has accumulated in the Bank.

There has been no formal meeting of the Trustees of the Fund this year, but each Trustee is familiar with the condition of the Fund. Considering the fact that the State is cutting off the direct appropriation of the Society, we are to be congratulated upon the thoughtfulness of Mr. Lyon in providing for this source of income so that the splendid work of the organization need not be given up for the lack of support.

Respectfully submitted,
CHAS. W. GARFIELD,
Treasurer.

FRUIT GROWING FROM A WOMAN'S STANDPOINT.

MRS. PAUL ROSE, ELBERTA.

Mr. President, Gentlemen and Ladies: Inasmuch as we are supposed to be *it*, I will show due respect to the gentlemen by addressing them first. When I read the program and saw that I was the only woman on the program, I wondered who the program committee had a grudge against—whether the audience or myself. You will no doubt find before I am through with what I am going to say that I am no talker, but Mr. Rose is here, and so I will say no public talker. If I had been giving more time to speaking, you see I would have had less time for fruit growing.

Nearly 20 years ago a man and his wife, living near Benton Harbor packed their household goods loaded them into a car and started them up north, to Benzie county.

While they were being loaded a rain which turned into sleet came up and ruined everything, so far as varnish was concerned. A superstitious person would have taken it as a sign to give up the job, but they were not superstitious so kept on with their work.

In the car with the household goods were two horses, a cow and a calf, a very fine calf. When the engineer came to get the emigrant car, he seemed to have been out of humor (perhaps his wife had not made him a good cup of coffee that morning for his breakfast). He struck the car so hard, it threw the car door open and the little calf fell out. The man with the car asked the conductor to wait for him to put the calf back into the car, only to be told to get in or get left.

As there was no way to let any one know of the predicament the calf was in, she wandered in the freight yards crying for her mama until the next day, when a good German woman took pity on little black bossy and put her in a barn and fed her.

Later the Railroad Co. was notified they would have to deliver said calf to her destination, which they did, giving her a ride in the express car.

Three years later, Black Bossy was a cow, and probably thinking to save the housewife any extra work, skimming milk and churning cream she gave skim milk. Six months later all they had left of Black Bossy was a beautiful black Poled Angus robe.

When the household goods arrived up north, his wife and their little three-year-old daughter, their foreman's wife and little daughter, started for the north woods as their friends thought.

When they reached Thompsonville they were notified there was a strike on the Ann Arbor Railroad and no one knew when there would be a train, so they went to a nearby hotel (this was 10 o'clock at night) only to be told it was full. They went back to the depot and found there would be a train in a few minutes, that would take them within four miles of their home. Thinking it would be better to be four miles than twenty as they were then, they took the train which arrived in the freight yards of So. Frankfort about midnight, where they were told there was no hotel nearer than a mile, no bus, no telephone, everything a glare of ice, and two little girls asleep, baggage, band boxes, bird-cage and such things that go with moving.

While deciding the next move to make two jolly traveling men offered to carry the little girls, which removed the greatest trouble, and they all started for a hotel. It probably was the first real work those men ever did, for they did some puffing before getting those little girls where they could walk, but very gentlemanly, saw the comical side of the affair.

The next day was bright and pretty and the husband, thinking to get some word from his little family drove to town, to find them waiting to be taken out to their first home of 80 acres of stumps, brush, and woodland, which was the nucleus around which has been builded what is now known as the Rose Orchards. There my life work has been put in helping to make them a success.

FRUIT GROWING FROM A WOMAN'S STANDPOINT.

To talk on this subject, I will have to refer to our work, as it is all I know. What we have done, all things equal, others can do. A person said to me the other day, "Every woman can't do what you have done." Perhaps not, but they might improve on my work. It wouldn't be best for every woman to engage in fruit work, as there are other lines of work for us to engage in. Just now we can vote and perhaps some day, hold office. I heard Prof. French of Lansing, say, "Men do not do their work haphazard now days." In speaking of the fruit work, he said, "They spray, prune, pick, pack and market their fruit with brains." I believe we have brains and certainly the gentlemen think so or they wouldn't have given us the right of elective franchise, and thereby removing from us the stigma of mental weakness and taking us from the ranks of idiots, imbeciles, Indians and criminals.

Fruit growing is very interesting, in fact it is fascinating. You plant the little tree, watch the buds start, then the blossoms and later

the ripened fruit. How well I remember our first crop of cherries. Mr. Rose said to me one day, "Get a little pail and we will pick our crop of cherries." There were less than four quarts of them, but we were as proud of that crop as we ever were of thousands of crates in later years. To a woman who wishes to take up this work or to one who by circumstances seem compelled to do something of this kind, by being left with a little family and perhaps a few acres of land or a life insurance with which to buy a little farm, I would say by all means, plant a few trees, not too close together and between the rows of trees, plant some variety of berries that will come into bearing early and help pay the expenses of growing the trees and of the family.

It may be a little hard at times, but wouldn't it be harder to live in town in a stuffy tenant house and take in washing or sewing and live up the insurance, besides depriving the children of the fresh air and the pleasure they would get from helping mama, until they will become a part of your work and will lend a hand to help put one of them through agricultural college and then come home fully equipped to take the care from Mother's shoulders?

A woman can plant a row of trees just as straight as a man. There are trees in our orchard that I helped to plant 19 years ago, and they seem to grow and bear just as well as those planted by the men. A woman can spray if necessary. My experience has been that there is no part of the fruit work that a woman can not do if she will study and use good sound sense, unless it is to plow, but I think she can hire that done all right.

A wife should familiarize herself with her husband's work so that she can direct it, at any time, during his absence, and then if she is left alone she won't be handicapped by having her help say, "She don't know anything about it, she won't know whether it is done right or not." I have never had a man or woman refuse to do the work as I told them to. Mr. Rose has been gone a great deal of the time during the growing of our orchard. At first he would dictate and I would jot down a routine of work to be followed during his absence but that has become unnecessary years ago, as we have had the same foreman for a number of years and he understands his part of the work as well as I do mine.

I have had help in the house most of the time, which has left me quite free to follow our chosen profession, Horticulture. Of late years most of my work has been in overseeing the pickers or packers. I have handled white labor in Indiana in raspberry work. I have assisted Mr. Rose in Alabama with his negro laborers, in the strawberry fields, and of course nothing but white labor on our farm up north. Some women may say, I can't handle the laborers; perhaps a few suggestions here in regard to this part of the work might help some of the wives of these young students, to have more confidence in their ability to help their husbands in their life work. I keep my help in the house from one to three years. When I hire my housekeeper I tell her just what I want her to do and what I will pay for the work and there is never any trouble over the work or wages. Always direct the work in the house or packing house.

If your help knows there is some one around to direct them, even if they understand what they are to do, they will go at their work with more interest. You can keep your help better satisfied and keep them longer, by having your work well systematized, and let them think they are expected to carry out their portion. A worker likes to know they are appreciated and a kind word is a little thing but will work wonders sometimes in accomplishing better and more satisfactory results.

We have had as many as 85 packers in the cherry work. We have never missed but one morning of being there when the seven o'clock bell rung. Don't ever leave your help alone, they will not work as well. Mr. Rose has often said to me when I did not feel able to go to the packing house: "Can't you bring your rocking chair and sit where they know you are and where you can dictate the work?" Be very firm and decided with the workers but don't nag them.

In Alabama I have started to the field with 125 negroes following along, laughing and joking about their little Boss, "She don't carry a gun or club." When Mr. Rose started his berry work in the South, the Southerner said, "You will have to carry a gun or club, for the nigger will have to be knocked down a couple of times before he will work good." We never had any trouble, kept our help, picked our berries in better shape than some of the fields where they worked their help at the point of the gun. We loaned our negroes one day to an adjoining berry grower. During the day Mr. Rose and I went over to see how they were getting along. When we came near where they were picking berries they expressed a delight at seeing us and when asked how they were getting along, said: "We don't like this boss. He carries a gun. We like you-alls better." We assured them that the boss would not hurt them if they worked all right, and then we started back. We had only gone a half-mile when we looked back and there came every one of our negroes. We stopped and when they came up we persuaded them to go back and finish the day, but they said: "No, sah; we will work for you-alls but we don't work over there no more." We saw how they felt about it so told them, "All right go back to their cabins and work for us in the morning." Kindness, even with the negro, got our work done better than a club.

We never hire our day help for any one piece of work. Then they can not complain if they are changed from one job to another, if I need more packers, I call them from the pickers and if the foreman needs more pickers I send the packers out to help him. We have had girls work 8 and 10 years in the fruit work. They enjoy it and will plan from one year to another, what they are going to do, and have their money spent, in their minds, a year ahead. Always be interested in each worker, study them to know what part of your work they are best adapted to. You may have a person that seems a failure at one thing and may make a splendid hand at something else. Our foreman brought a man from the orchard to me at the packing house and said: "Can you use him here, I can't use him in the orchard. I set him to nailing packages, and he did fine work the rest of the season.

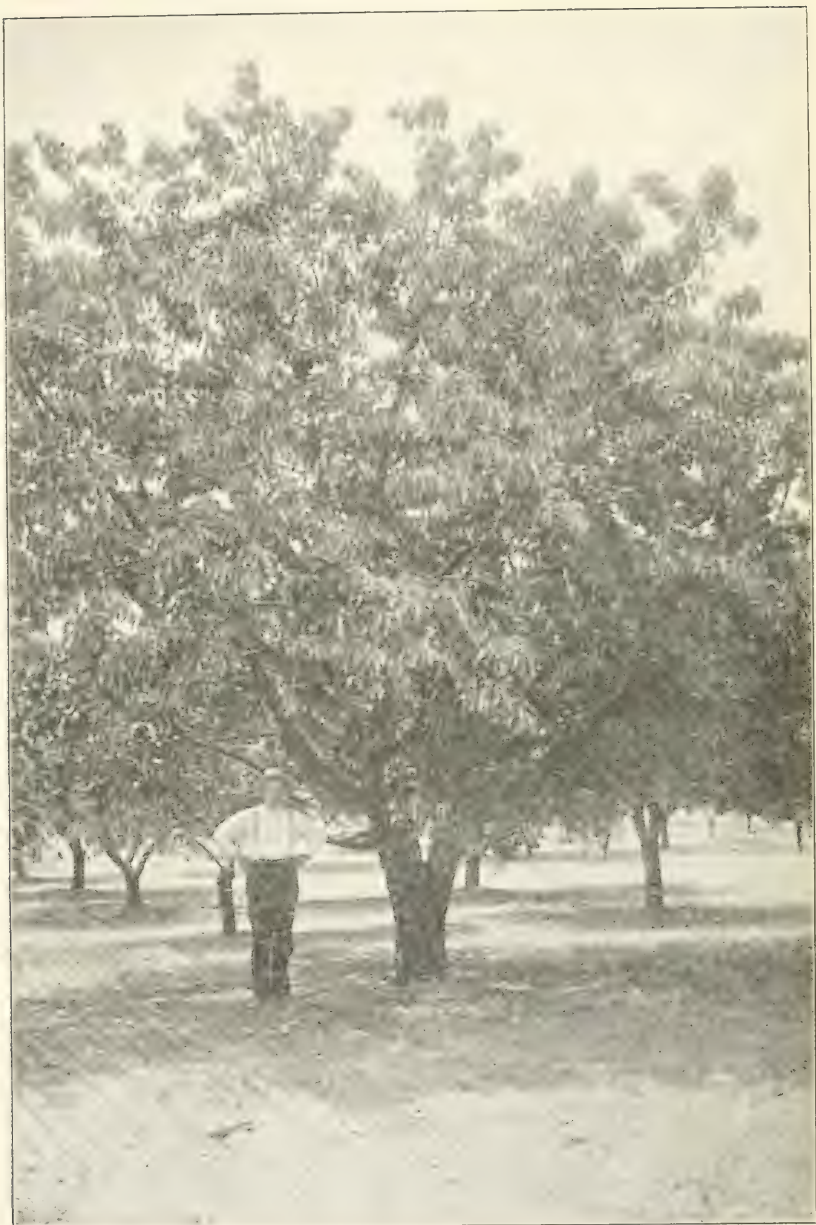
Just a word to the woman that has some money to invest and contemplates launching out in fruit-work. Be careful in selecting a location, if possible get near enough some town or shipping point where

you can easily market your fruit and where you can get help to pick it, and don't plant too extensively until you are sure you can handle the business, and don't expect to have time to read stories, papers, call on your neighbors or embroider during the summer months. I heard a joke on a man who bought some land in Florida, unsight and unseen. After the bargain was all made and the price paid he thought he would go and see his new farm. The land shark took him out in a boat and after paddling around awhile said: "Your farm is under here; when you get it drained it will be all right." Don't buy land unsight and unseen. Let the men do that. We women may be easy but there are others.

CODLING MOTH AND APPLE APHIS.

PROF. R. H. PETTIT, M. A. C.

Friends—In our ordinary spraying for the codling moth we use two sprays, one spray just as the petals fall, and another spray the first week in August. Beside these, we sometimes put on another about fourteen days after the petal spray, and sometimes one between that and the first week in August. These two last sprays are applied for the scab fungus primarily but we usually add a little poison on general principles. We time the first spray something after this fashion: The petals fall, and for a while the stamen bars fill the calyx completely full. Sometimes this condition lasts for two days and if the weather is very moist sometimes for ten days but sooner or later the stamen bars will wither leaving the calyx open for two or three days, and just at that time we get the best results with an arsenical spray. I have waited in experimental work for ten days in order that the stamen bars might wither and allow the poison to fall into the calyx cup. Now, with most varieties the young sets are in perfect condition for only about two days. If we could all put on our sprays at that period we should get the optimum results but the time is too short. We have not enough rigs to get over the orchard or enough skilled men to operate the rigs so we must try to get the poison into the calyx cup in some other way. Professor Melander of Oregon has been experimenting for some time along these lines and while his recommendations for Oregon probably will not suit our conditions in toto, still theoretically there is much to be said in favor of this plan. This idea is to force the spray in between the stamen bars so that it will fall into the calyx cup and thus utilize all the time that elapses between the falling of the petals and the closing of the calyx followed by a downward turning of the fruit. This gives us about ten days instead of two in which the work can be done. Professor Melander also advocates getting along with one spraying. I do not think we should find this to any advantage even if we could get along with one spraying, since we have to spray for scab anyway in this country and the cost of the additional poison is so little in comparison with the benefit obtained that we would all of us rather put the poison in for insurance if for



Royal Ann cherry tree on farm of W. B. Gray on Grand Traverse peninsula. This tree has borne 18 cases that brought \$27 in one year.

nothing else. The spray to which we have referred should go on when the petals fall and should be put on under comparatively high pressure. About 200 pounds is all right. A coarse nozzle of the bordeaux type will carry the poison in between the calyx bars much better than can be done with a fine nozzle especially if the spray is directed downward from above. Of course the work must be done thoroughly. One can always check up on his work by going back over the sprayed part of the orchard and cutting open some of the little fruit sets. If one finds a drop of poison in each little set, then he knows that the work has been thoroughly done.

The second spraying in the first week of August is aimed at the second generation of larvae. As most of the eggs are laid on the leaves and as the young feed where they hatch out before going into the apple, a mist spray which deposits a thin layer evenly all over the foliage is best.

Now, about plant lice. For two years we have found numbers of plant louse eggs on apple trees in early spring and late in the winter. Some of you will remember finding large numbers of these eggs a year ago last winter and again last winter,—little black shiny eggs on the branches. Two years ago they were more plentiful than last year but when the season came on two years ago it was warm and dry and the plant lice hatched out all right but disappeared about blossoming time. Last summer the season was wet and cold and they started just the same as the year before only they did not stop at blossoming time, rather getting worse as the season advanced. Now, we can see the effect on the apples. Many apples in the middle part of the tree are hard and undersized.

Now, for the explanation. There are three kinds of plant lice that work on apple trees. First the common green apple louse, the rosy louse, and a third one. I do not know that the third one has any common name. The common green louse lives on apple trees early in the spring. About the time the blossoms open it goes to orchard grass and stays there all summer to come back about the time that apples are gathered. The other green louse leaves about the same time and goes somewhere that we lose track of it, its offspring returning also in the fall. The rosy louse stays on the apple all the year around.

When the rosy louse multiplies and keeps its numbers up all summer, then is the time we have trouble. This happens in seasons when we have a backward spring, a cold wet spring extending into the summer and the reason is because cold weather does not agree with the parasite which keeps the rosy louse in subjection. This parasite is a little wasp-like creature which thrusts its eggs through the skin into the bodies of the plant lice. There the young grubs from these eggs feed; each one on the tissues of a living host, to come out later as an adult and repeat the egg-laying process. Now, it happens that the parasites are more sensitive to temperature than are the plant lice themselves. The parasite will stop growing during cold spring days at a time when plant lice will thrive and multiply. For this reason cold, wet springs hold back the parasites for a long time giving the lice a chance to get such a start that the parasites do not catch up with them all summer.

Question—Will lime sulphur kill the eggs?

Answer—No, I think not but the old home-made lime-sulphur seemed to prevent the settling down of the young lice after they had hatched.

Question—It has been stated that salt and water would do this.

Answer—No, it will not kill the eggs. Even lime and sulphur will not kill many of them. There is nothing known at present which will kill the plant lice eggs without injuring the buds and if we get a cold, wet spring the parasites are held back so that the plant lice multiply and get such a start that they last all summer.

A Member—What is a remedy?

Answer—Dry, warm weather,—for spraying purposes lime and sulphur are of no use after the leaves come out. Whale oil soap costs too much. Probably the most efficient spray is nicotine. It costs a great deal but I do not know of anything that will take its place. It is at least safe.

Question—How strong?

Answer—One to seven hundred parts.

Question—What time should we use it?

Answer—That depends on the weather. Two years ago we received a great many requests for information about this same thing. The eggs were thick and were hatching out and we took a chance on spoiling our reputation and guessed that the lice would not be very bad. We guessed that way because the spring had been warm and dry and we hoped that the parasites would take care of the lice if they were let alone. We advised the people not to spray unless they felt worried about it and it turned out all right. This past season started in with lots of eggs hatching into lice but the weather had been cold and wet and we advised the use of some contact spray, nicotine, kerosene emulsion, tobacco tea or something of the sort.

Question—Can you mix this nicotine with lime-sulphur?

Answer—You do not want to mix lime-sulphur with anything until you are ready to put it on. It is claimed by the makers that you can mix nicotine sulphate with lime-sulphur safely if you do it just before you apply the spray.

Mr. Hutchins—The government is conducting an experiment in our section during the past summer and fall on one of the places there, and carrying it out with that same idea. They put on the arsenate of lead, and lime-sulphur at ordinary strength, and carried it with a high pressure and forced the spray right down onto the trees, which were low, and they did not give them another application for the codling moth. One spray after blossoming was given and they omitted the summer spray for the codling moth, and comparing that with the others. I have forgotten just the proportion—there was not a decided advantage with the summer spray.

The Chairman—The next topic on the program for discussion is one that we should all feel deeply interested in—one that should appeal to every fruit grower in the State of Michigan, and every fruit grower in the United States, and that is the new Sulzer Apple Law, and we will hear from Mr. R. G. Phillips, Secretary of the International Apple Shippers' Association.

THE NEW SULZER APPLE LAW.

R. G. PHILLIPS, ROCHESTER, N. Y.

Mr. President, Ladies and Gentlemen: It gives me a great deal of pleasure to be here today, even though it is a rainy day, and for several reasons: First, I am always willing to do anything for your good Secretary, Mr. Bassett, and for Prof. Eustace, one of the members of your Agricultural College staff; and then, these and other gentlemen have said so many things about your good fellowship, your energy and intelligence, that I felt that it would be a real pleasure to speak to you; and then further, because I have the interests of better packing very much at heart.

Now as to the intelligence of Grand Rapids, there is no question. There must be something about the air that stimulates an abnormal mental development. I received an illustration of it this morning. I went into a barber shop to get shaved, and the man behind the razor had evidently been out a little late the night before, for his hand trembled a good deal, and before he had fairly begun, he cut me under my chin. I jumped out of my chair, and began to read him a temperance lecture. I said to him, "George, this is an awful thing—you can see the evil and influence of strong drink." Quick as a flash, he answered back, "Yes, boss, it sure does make the face tender." (Laughter.)

You can not beat that outside of Grand Rapids. I said to myself, "This place is altogether too keen for me. I had better take the next train back for Rochester." But then I remember that Prof. Eustace told me that I might go for you just as hard as I pleased on the subject of packing apples, but I argued with myself that I was a long way from home, and I was in something the same frame of mind as the dear old sister, who every time her pastor mentioned the name of the devil, she would bow her head. He stood it as long as he could, for it worked on his nerves. Then he went to her and inquired the reason why she did it, and her reply was: "Yes, you are right—I do bow my head when you mention the devil's name, and what is more, I am going to keep right on doing it—we can not be too careful, for you can never tell what will happen." (Laughter.) But there is one thing that I will not be careful about, and that is, the condemnation of the reprehensible methods of packing apples, practiced by so many people.

The packing of apples is always a delicate matter. Like all subjects involving sin and wickedness, people prefer to hear about the other fellow's crimes, rather than their own. Every time I talk on this question I know just how a minister feels when he tries to arouse his congregation to the error of their ways. On the one hand he has his duty to perform and on the other are some of the pillars of the church who are likely to reduce his salary if he isn't careful. I have this advantage, however, I am not running for office and there is no one to reduce my salary. But even if there were, there is one thing concerning which I will not be careful of condemning to the limit of human speech, and that is reprehensible methods of packing which

result in the "junk" that ruins our markets, alienates the consumer, causes loss to the dealer, and ultimately reacts upon the producer. And I want to speak to you about it, not because you are any more guilty than anyone—perhaps not so much—I don't know—but because I believe it lies in the power of people like yourselves to absolutely prevent the evil and because I have the best interests of the apple industry at heart.

We are not measuring up to responsibilities. We are not proving ourselves worthy of this magnificent commodity which we grow and handle. I sometimes think, yes, I know, we are blinded to the finer points of horticulture and the finer points of the fruit which we handle. We are blinded by a variety of causes, a general spirit of don't care, a familiarity with the great things about us which leads us to take them as a matter of course, and at times by an over-reaching greed, which does over-reach itself and not only prevents us from attaining the high mark we ought to but actually returns less in dollars and cents. You as growers are creators, working in harmony with Divine laws. You bring into being an apple out of mother earth and dew and rain and light and darkness, and the warmth of days and the cool of evening, plus the energy and intelligence which are yours. You catch the elements of earth and air, and mind and body, and out of all these form a new substance which we call an apple, with sunshine of its cheek and joy in its heart. And to this extent you are a part of divinity. There is no existence more independent, and no vocation which calls for more of the whole man. *To produce a perfect apple requires the Almighty plus a Man.* I therefore submit we should recognize that we are co-workers in an undertaking which should appeal to our finer instincts as well as to the material side.

Coming to the more material aspect, within the last few years thousands of acres and trees by the million have been set in every state where it was imagined a tree would grow. Old orchards have been reclaimed, pruning, cultivation, fertilizing and spraying have been practiced as never before. The investments in orchards are not very great, and by all walks of life from the clerk and the teacher, the doctor and lawyer and minister to the legitimate or real fruit grower. The capacity for production has been increased until it was undoubtedly never greater. Production under normal conditions must be expected to continue on a much larger scale.

You thus have not only a noble calling, the inherent merits and responsibilities of which I trust may appeal to you more and more, but there is also a vast financial investment in orchards throughout this broad land which every true man and every man having the interests of his country and fellowmen at heart is bound to preserve and conserve to the limit of human endeavor.

Now what are some of the ways in which this can be accomplished? There are two principles which stand out above all others,—first—abolish junk, and second, advertise. I shall say but very little about the second at this time, because we are now primarily interested in the first.

I said a little while ago that to produce a perfect apple requires the Almighty, plus a Man. And, based solely upon experience, I have

found that to produce a well packed barrel of apples also requires the *Almighty*, plus a *Real Man*. If you have a real Man with a capital M, it may not require so much of the Almighty, but I have seen a multitude of cases where Divinity should have had full sway. In other instances the evils of packing have resulted from ignorance of how to pack, of its bad effect upon markets, and from a general tendency which all of us in America have of looking only unto today instead of building something which will stand through the years. We are "penny wise and pound foolish." If it is possible, I want to see an awakening in this country on the part of grower, dealer and everyone who handles the apple. I wish we could get a baptism of morality, the square deal, intelligence to our best interests and determination to realize our possibilities, and I'll tell you why.

In every year when there is a crop, junk is the ruination of markets—just plain J-U-N-K. The trouble is we haven't cider mills enough in the country, or a disposition to patronize those already existing. There is many a God-fearing community without even the sign of one. And as long as the rubbish, the Junk and topped-off packages, cider apples and windfalls, and worms and culls are shipped, we never will have a market.

The reason is self-evident. It is written large in the very appearance of the fruit itself, in the deception which the package conceals, and in the inevitable disgust and resentment which that deception fosters. Confidence is the foundation of all progress, industrial, mental and spiritual. Faith is at once the basis and the key-stone of success. The old order of things has passed away when sharp practices were a badge of merit and dishonesty a thing to be commended. Go where you will in the business world today and reliability is the watchword. Integrity and confidence are at the bases of this wonderful commerce of the age in which we live. Men have found that they and they alone pay.

How long do you imagine the steel trust would continue to pay dividends if it furnished steel beams that cracked at the first load, and locomotives that fell apart on their first trip? How long would your groceryman be out of bankruptcy if he sold you sugar that was half sand? What would you do about it as a consumer? Suppose we change places for a while with the consumer and the retailer of apples. Let us take a state of facts that illustrates the normal procedure in the markets of the country: The ultimate jobber of fruit today buys five barrels of apples, takes them to his store and finds them excellent. He figures a fair margin of profit on them, sells them and the customer is satisfied. Tomorrow he buys ten barrels to satisfy the increased demand. Those ten barrels turn out to be stuffed; they are full of windfalls, wormy apples, ciders and culls. He puts them out and straightway the telephone begins to ring and voices begin: "Come and get those apples; we don't want them." Back they come to the store. He either sorts them over, throwing part of them away and marking up the price on the balance, or he in turn calls up the wholesaler and advises him to come and get his apples. Now let this experience be repeated a few times and the inevitable result is disgust with apples clear along the line. The consumer refuses to buy and the retailer,

instead of handling ten barrels a day, handles two or three. He becomes alarmed and to protect himself from loss marks up the retail price to the clouds and reduces his purchase price to the wholesaler. Consumption is limited, markets are restricted and whoever owns apples takes a loss.

These experiences are repeated year after year in every city of the land. The City of Rochester, where I live, in the heart of one of the greatest apple belts of the world, is one of the poorest markets in existence. It ought to be one of the best, but the growers of apples who have a market at their door draw into that city and peddle the culls and "junk," until we have the reputation of being consumers of cider apples.

One evening early last winter I was at dinner with a friend of mine and his wife said to me: "Why can't I get any good apples? You say there was a big crop and plenty of them, but I haven't had a decent apple this year. I am through with them. I shall not buy another one. The last I ordered I threw away and I could only use half of those I ordered before." Inquiry revealed that she had been getting cider apples and fruit affected with the Baldwin spot. Here was a consumer alienated for the rest of the season. In Philadelphia, in 1907 and 1908, it was almost impossible to force the sale of apples at any price. Housewives would come into the stores and refuse to even look at or consider them. Retailers were met with the statement, "I don't want to even hear the word apple—I am sick and tired of them. I am through with them for this year." And this thing went on up and down the land until there was no market and the losses of growers, dealers and handlers mounted into the millions. In western New York alone they amounted to upwards of \$3,000,000. Killed by "junk" and the worst lot of rubbish ever attempted to be foisted on a confiding public. Over the fresh made grave of that year and other years since there should have been erected a shaft of black marble and on it in white letters should have been: "A Suicide—A Jackass Kicked Himself To Death."

What a commentary upon our intelligence, our business acumen, our foresight and our honesty! Why, we weren't fit to be trusted with a peanut or popcorn wagon.

At one of the hearings last winter on the Sulzer Bill we had an actual demonstration of the vices of a good deal of our modern packing. We went on the public market in the city of Washington and bought at random, without examining it, a barrel of apples branded "Extra Fancy Virginia Rome Beauty" and had it sent up to the House Committee Room of Coinage, Weights and Measures. We opened it there for the first time for the purpose of comparing it with a barrel of apples packed by Hon. S. L. Lupton of Winchester, Va., in accordance with the provisions of the old Lafean Bill—now the Sulzer Bill, and a barrel which we knew was right. That barrel of Rome Beauties didn't have a peck of apples in it, outside of the face and back, fit even for a No. 2. They were diseased, spotted, under size, off color and wormy. They were scarcely fit for cider. And yet that barrel was branded "Extra Fancy." Thousands of barrels just like it are in the markets of this country every year. They pass into the hands of the

retailer and then in half bushels, pecks and quarts to the consumer, bearing at every step a curse upon the business we have at heart and destroying confidence in a multitude of homes. This is just the point—The evil does not lie in the loss to the man who packed it. If he would lose every dollar he possessed, it would be a cause for thanksgiving—the more he loses, the better. But the evil lies in the damage done to the whole industry, including those four square growers and dealers who believe in giving an honest deal.

Don't be misled. If the other fellow—your neighbor—raises, packs and ships "junk," he is injuring you, no matter how well you pack. Never was there a more mistaken notion that it didn't matter what the other fellow did as long as you were all right. It has led to more evil and more temporizing with wrong doing than anything of which I know. Just so sure as the sun rises, the poor fruit brings the good down toward its level rather than the reverse. The man who packs good fruit gets a greater reward,—that is true, but not nearly in proportion to what he ought to get or would get if the "junk" were kept out of every barrel. When a year comes along when the quality is generally poor and the packing as a consequence is worse than wretched, when crops are large and packing indifferent and markets go to pieces as a result, the innocent suffer with the guilty. "The rain falls on the just and the unjust." And while the dishonest packer may drown in the torrent, yet the honest one many times has a stiff time reaching the shore.

You are, therefore, your "brother's keeper." Make no mistake about it. It is an act of self-preservation. I hope the time will come when associations like this will make it a point to see that the man who persistently violates the common-sense rules of packing, rules which business sense teaches to be wise, either changes his methods or gets out of the business, and I don't care whether he is a grower or a dealer.

I said a little while back that faith or confidence was the basis of commercial prosperity and development. There is no mystery about it. It is just plain common sense and ordinary business intelligence. People resent being imposed upon. To cheat them is to arouse a bitter and justifiable hatred. When the consumer places on the counter good money, worth one hundred cents on the dollar, he has a moral and legal right to expect in return a commodity worth one hundred cents on the dollar. If he doesn't get it, there is trouble. He settles these questions beyond our poor power to change. He settles them so effectually that business enterprises are ruined, markets destroyed and enormous losses created. For, gentlemen, the consumer *must* be pleased. He is the court of last resort. The only way he can be pleased is by giving him a square deal and value received. If he doesn't get them he goes back on the commodity and it is then too late to win him over. He refuses to be won. It matters not what we may call him or how much we may wriggle and twist and blame everyone and everything for our sorry plight, from an eclipse of the sun to Hindoo magic, there he stands the same old Gibraltar. We must please the consumer; we must deliver the goods; we must "*make good*." The time has come to absolutely destroy root and branch every element of dishonesty, sharp practice and ignorance in the packing of apples. The time has come

when we must cease temporizing with evil. "Ye cannot serve God and Mammon." It is applicable in more ways than one. A house divided against itself must fall. If fifty per cent of the people pack junk, it injures the other fifty per cent. They must be rooted out. You up-to-date growers with large investments and the business at heart owe it to yourselves.

Apples are not worth a dollar merely hanging on the trees. Their only value lies in the ability to change them into real money. And this change in its last analysis comes from the consumer. Our supreme thought and care therefore ought to be to please him. From the times these apples are in blossom until they are packed, and especially while being packed, we ought constantly to have him in mind. We ought to put ourselves in his place every packing season and if we did, there would be no further trouble. Instead, however, of doing this, our sole thought has been to unload just as much "junk" as possible as someone else—to pass it along and take the chance. It is a mystery to me that apples sell as well as they do.

Now you may want to know what can be done to remedy conditions. It is easy to criticise and find fault, but to build up and create, that is the great work—it is a man's job. You have the remedy at hand in the Sulzer Bill, to the passage of which your secretary, Prof. Eustace, the Congressman of Michigan and others in this commonwealth lent their assistance, and that help was greatly appreciated. You have the standard of a Government of the United States at your hand and you have the right to brand on your packages the index of its approval. That brand tells to the world at large that there is an honest pack and a square deal underneath it from the face clear through to the cushion. It says there are no turnips and pumpkins and leaves and stones in the center. It proclaims positively that there are no cider apples, no worms, diseased or windfall fruit in the middle of that package. It looks the world in the face like a man, and says, "I deliver the goods; try me and prove me." What more can be asked?

I regard this bill as coming at the psychological moment, at the beginning of a crisis in the apple industry. We are at the parting of the ways. By following the old lines and refusing to make the change which common sense and experience have taught to be wise we will court something of the same depression which followed the industry in the eighties and nineties. By making the change and establishing ourselves upon the right basis, we may reasonably hope to standardize it and make its production staple is to increase its consumption, decrease the risk and cost of handling and form a proper basis for advertising.

Now just a word on these points. The retailer and wholesaler today who handle apples buy them in the dark, so to speak. On Monday they may prove to be good, on Tuesday fair and all the rest of the week very poor. The waste in many instances from decayed windfalls in the center of barrels, cider apples and diseased stock is great. The business is a gamble—worse than poker in its uncertainty—because the bluff won't work with the consumer on any occasion. The retailer, therefore, is forced to put his selling price high enough to protect him against any emergency and keep it there. Do away with this un-



Three prominent members of Grand River Valley Horticultural Society at the June meeting, 1912.

In the center Mr. W. N. Cook, a charter member who has recently passed away.
 At the left the late Harvey O. Braman, pioneer peach grower of western Michigan.
 At the right Mr. Charles W. Wilde, apple specialist.



Seven year old Peach Orchard of O. F. Marvin, Holton.

certainly, give him a standard pack—a staple product—and he can afford to handle it on a small margin because he knows that he can depend upon the reliability of the commodity.

Now as to advertising: There is nothing to be gained unless we have something to advertise, and that something must be capable of identification and must be an honest commodity. Imagine advertising the heterogeneous mass of apples that go onto our markets today! Induced by a glowing word picture of the health giving properties of the apple, or lured by the rosy red on the cheek of a lithographed Baldwin, some poor consumer buys a barrel only to find that it has three layers on the face and two on the tail that are good, while the rest run in size from marbles to butternuts; in color from a green gage plum to a sick lemon, and in health to prickly heat to smallpox. The commodity which you advertise must square with your promises, and when it does, there is no greater power under the sun. Advertising has changed the map of commerce. It has established financial empires and crowned "Captains of Industry." It has created demand along a thousand lines and stimulated industry the world around.

In the Sulzer Bill we have every requirement necessary to a scientific advertising campaign. In the Standard Grade we have something definite and capable of identification. No man can be misled. It is a specific brand and when he buys a barrel with that brand upon it, he knows that he will get what he buys. Standard Grades can be advertised in good faith with the full assurance that they will make good no matter where they are bought, from one end of the country to the other. And, gentlemen, we hope they are going to be advertised. By another year plans will be perfected for undertaking this work. A committee of our Association is now at work upon this very question and we hope that when that plan is ready every member of the Michigan Horticultural Society who believes in a better pack and who is willing to use the Sulzer Bill will give it his financial support. You have the greatest power and the most favorable circumstances ever granted to an agricultural product. Think of it—a Standard Grade where apples established by the United States Government and on which can rest that powerful lever, publicity! Are we blind? Has reason departed? Are we but little children? Is common sense no more? Can we do nothing but complain when the door of opportunity stands wide open before us? Give me the power and I would pack every barrel under the Sulzer Bill; I would advertise those grades and I would guarantee to double consumption at a fair price. The square deal plus publicity are the keystones to our arch of success, and without them you can do nothing.

The man who persists in refusing to use Standard Grades is like a man going to war without a gun. He isn't going to a battle, he is going to a funeral. Make no mistake about it. Canada, under her Fruit and Marks Act, outstripping us in foreign markets and the Northwest has cut off our fancy trade because of her packing. These are not idle dreams. It is time to wake up, to do something, to act. Let me read you the export figures and what our foreign Consuls say.

Taken in five-year periods in 1882 to 1907, the exports from the United States exceeded those from Canada all the way from 16% to 300%,

but during the last five years this country shows a *decrease* under Canada of 14%. This is the first time it has happened in over thirty years, and should cause us to wake up. Canada has shown a steady increase from 1882 down to date, and a very large increase since 1902. At the close of that five-year period her exports had reached 2,450,101 barrels; at the close of the last five-year period they were considerably over 5,000,000 barrels, or more than double. During the last five years the United States has shown a decline of from over 8,000,000 barrels to about 4,500,000 barrels.

What is the cause of this? In 1902 (I think) the Dominion Government established its Fruit and Marks Act, and ever since has been acting thereunder. This Act was amended in 1906, and you will observe that from then on her success has been phenomenal. In an address delivered before the New York Agricultural Society at Albany, N. Y., during the week of January 15th, J. A. Ruddick of Ottawa, the Dominion Cold Storage and Dairy Commissioner, said that before the law was enacted the apple industry in Canada was in a declining condition and seemed doomed. Said he:

"The packing was so bad no one would purchase apples without seeing them, even though they were offered as marked with a dozen Z's, a mark of superiority, as they sometimes were. * * * There is still improvement to be made, but on the whole the markets of fruit especially of apples, has almost been revolutionized. Brokers will now purchase on the grade with a reasonable assurance of getting what they bargain for."

Some of the big reasons for the decline of our open exports may be summed up in the words, "junk," cider apples, poor packing, deceit and lack of standards, undermining confidence and disgusting the purchaser. I wanted to find out last year what the trouble was and how we could broaden our markets. I took it up with our foreign consuls and others, and here are two samples of the replies:

Quotation from a letter by a U. S. Consul in Europe, written to the Secretary of the International Apple Shipper's Association July 13, 1911:

"There is no doubt, however, that the sale of American apples could be greatly extended, if our shippers would be more careful in the selection and packing of apples intended for this market.

There has been so much dishonesty practiced in the past * * * that a number of dealers would not handle the American fruit if they were not obliged to do so * * *"

The following is a translation of a letter received from one of the more important handlers of fruit in ——— * * * * * in answer to interrogatories sent from this office:

"(1) During the past season American apples in barrels have arrived badly damaged, owing to the careless manner in which the fruit was packed. American packers do not use the same care in sorting apples as in former years. In most cases the barrels contain apples of three or four different sizes and vary greatly in appearance. The top layers are good, while the middle and bottom rows are very different both in size and quality.

Inferior fruit should remain in the United States. In my opinion the

trade in American barrel apples will decrease from year to year.

I am also of the opinion that the imports of American apples into this country would increase enormously if the prevailing defects could be eliminated."

Quotation from a letter written to the Secretary of the International Apple Shippers' Association by a large distributor of apples in Hamburg, Germany, April 15, 1911:

"Apples in barrels: You are undoubtedly aware of the fact that the crop of last year was of about the poorest quality we ever had, and, although we tried to get the best possible stock for our market, yet the quality gave no satisfaction whatever, and by about the beginning of December the import ceased altogether. As apples were very scarce in our market, those that were shipped here brought fairly satisfactory prices, but by about the last of December there was practically no shipper and no importer who would risk any money in shipping poor stock across the Atlantic. Thus it happens that the total imports of American apples in barrels amounted to only 52,000 against 250,000 to 300,000 barrels five to seven years ago. We wish to point out that it is absolutely necessary for the growers and shippers in the East to improve quality in packing, or the Eastern apple will find no buyers here any more."

Now our foreign trade is of the utmost importance. It is a safety valve. It needs to be increased rather than decreased, but to increase it we must get in line with Canada. They are planting trees in Canada just as fast as on this side. The last Canadian Crop Report stated that the number of trees not yet in bearing north of Lake Ontario now exceeded those in bearing, while Nova Scotia is making tremendous progress. Nova Scotia has some of the best cured for orchards in the world and her best posted men stated positively that in the next few years she alone will be able to supply the foreign market. What are we going to do about it? Are we going to give up in despair, or get busy and fight it out?

When Fort Sumpter was fired upon and the irrepressible conflict was on, the boy and the man on the farm and in the store from Maine and Michigan, from Old Virginia and Alabama, shouldered the musket and fought for the right, as they saw it, on the heights of Gettysburg, from the Rapidon to Appomatox and from Chattanooga through Atlanta to the Sea. They were men of conviction, whether they wore the blue or wore the gray. The rifles loaded with real powder and real shot piled the bloody field of many a Cold Harbor with the evidence of their sincerity, and their bayonets of real steel swept over the blazing ramparts of many a Fort Wagner.

We are now in an irrespressible conflict which must and will be settled right. We must have markets; we must eliminate chicanery and evil practices. We must conquer deceit and fraud. There are our ancient enemies against which war has been waged; but don't go into this fight with your guns loaded with "junk," cider apples and windfalls, and in place of a real bayonet a limber twig from the old apple tree. If you do, you will go to a funeral and you will be the corpse. Load your guns with Standard Grades and have the cold steel of integrity on the end of them, and march on to victory.

The most important thing to which this Association can give its attention for the next few years is packing. Establish packing schools, like the Virginia Horticultural Society, and teach your people to use the Sulzer Bill. Make it alive. Use it and then insist upon selling under it. If some weak-minded buyer wants to put up a lot of "junk," set the dog on him and order him off the premises. Don't allow this poison to go out of your orchards. You can't tell what will be done with it. Buyers and dealers are just as bad as growers, and I don't know but they are worse. We are tarred with the same stick, but I am appealing to you because you are the fountain-head and because I know that the buyers can't solve the problem alone.

Gentlemen, there is no use in just talking. It is a waste of time to consider these questions unless action results. I didn't come out here for fun. I came because I know that we must have a better pack. I know what we are up against. I came because I believe heart and soul in the merits of the Sulzer Bill. It is the way of salvation and I beg of you to rally around and fight the good fight.

When Saladin, the Sultan, thrice conqueror of Syria, the man who made the desert blossom with civilization and before whom the cohorts of Richard the Lion-Hearted trembled—when he died there was carried before him in his funeral procession his shirt and before the shirt walked a crier who cried unto the people, "Behold all that is left of Saladin, the Mighty Conqueror of the East!"

When Robert Bruce of Scotland died, he committed his heart in a golden casket to the Douglass. The Douglass setting out upon the crusades carried the heart of Bruce as his most sacred possession. When in Spain and surrounded by the Moors, seeing the tide of battle turning against him, he flung far the golden heart of Bruce unto the very midst of the conflict crying, "Lead on, Oh Heart of Bruce, living or dead the Douglass will follow thee."

I prefer to follow the heart of Bruce rather than the shirt of Saladin. I do not care to walk in the funeral procession of the apple industry while before it is carried a barrel of "junk" and before the "junk" a crier who shall cry unto the people, "Behold all that is left of a great business that was established by the Almighty, favored by the Government and blessed by every suitable facility, but was killed by its friends." Throw out your Standard Grades into the very midst of the conflict and say, "Living or dead, the Douglass will follow thee." The golden heart of Bruce is in your keeping and the keeping of every man who is interested in the apple. Guard it, use it. Pack under the Sulzer Bill.

DISCUSSION.

A Member—I think we should take some action on this Sulzer Apple Law. It is not compulsory. I wish we could get all our members to pack under it—it would be a good thing—and to ask all our subordinate societies to do the same.

Mr. Smythe—It seems to me that we should carry this a little further. It is not the honest man that we want to get after—it is the dishonest man. This Sulzer law is a good thing, but what we want is something for the men who do not come to these meetings. We have hundreds

of berry growers who are Germans, and they will put in any old thing in the box. You can not get them under the Sulzer law. I have advocated that we should have a law by which every man puts his name on every package sent out. I know of a case where a shipment of sixty barrels of pears went to Milwaukee, and when they were opened up, the middle was filled with apples. There are those who are intentionally dishonest, as in this case, and we want a law to reach them. Most men are honest, if made so, either through the fear of God or through fear of the law. We must come to some definite understanding in this matter, and if possible provide for something more stringent than this Sulzer Law.

The Chairman—I think there should be some time set for the discussion of this question, when we have more time at our command than we have now.

Chairman—This discussion will be led by Mr. Hutchins.

Mr. Hutchins—I will not say much. We have had an excellent address and many valuable and interesting points have been brought out. I may say, however, that I have felt that I would like to go into the detective business and if possible learn where those fellows are that are doing this dishonest work, but Mr. Smythe has given us a tip. But I am a little apprehensive, from what I hear, that if we should catch them and presume to give them their just deserts, it might increase our taxes to an alarming extent, and fill up our public hotels. But it is not the people around our section—they are farmers, and they assert that they put their apples up right—it can not be any of those—it must be some of the growers around here. (Laughter.) If I should blame it on to Mr. Wilde, we might get into a scrap—we don't want that, so I will not carry the matter any further.

But seriously, gentlemen, we want a law that will enable us to be honest, and then gain credit for it. Under the operations of this Sulzer law, we can not do that. If a consumer gets one barrel that is bad, he is afraid of the next fifty.

You will be interested I think, in what we are doing, and will bear with me for a few moments. And by the way, there is one feature of the fruit growers, we do not have any trade secrets, so in lieu of any advertising you may accuse me of doing, I will take the ground that I am giving away trade secrets.

We have an apple organization in our parts, and there are 100 members. The apples are turned over to the Fruit Growers Exchange, with no string tied to them, and the Exchange controls them just as much as the commission men control the fruit sent them. When a sale is made, 5% is deducted to cover the cost to the Association. We put a packer in every orchard, and he oversees the sorting, packing and putting this fruit into the barrel, and the fruit is put up under the provisions of the Sulzer law. You will be interested in knowing how that fruit turns out. There is a good deal of blight or scab—none of this must go into this Sulzer grade. There are grades of apples there where the growers are putting them up, and perhaps 90% of them will go into a growers' grade, perhaps a commercial grade. The peculiar feature of that situation is that the buyers will go to these raisers outside of the exchange and will pay them as much, or perhaps more for the orchard run of

apples than they will pay the exchange for these extra fancy grade. Of course they want to get a slice out of everything that goes out—that is at the bottom of the difficulty. But with any packing of these same apples, fifty per cent of them will go into that extra grade. That is what you may be up against when you undertake this method of packing. This year I am satisfied that it is not a paying proposition. They are not willing, as I said, to pay more for this brand of apples than for the common ones. For instance, a man came to us and wanted to get ten carloads, and offered us \$2.25 a barrel for our prime apples. We asked \$2.50. Then he went out among the growers and paid \$2.25 a barrel for the orchard run, but was not willing to pay us \$2.50 for this grade of fancy apples. We have to take \$1.50 to \$1.80 for what we call firsts, but they are not fancy. And taking the two grades together, we can dispose of the major part of our fruit at these prices, but it has not been a paying proposition this year. However, we are lining up a trade in the smaller places—we have put a couple of men on the road—and the men in these smaller places are taking from one to five cars each, which they are turning over directly to the retailers and consumers, and I am satisfied that we have there a trade that will take our fruit in the future and be satisfied with it. The grade is all right. Here is the brand we put on our barrels: We have a stencil. We have a stamp to give the size in inches of apple; then a number that indicates the packer, and he is the person who is held responsible, and he is no more interested than the grower—he has a reputation to establish. As things are developing we are very much gratified with what we are doing, and we are pretty sure that in years to come we will have a market for our fruit through this outlet. The members are standing by and bringing in their fruit and turning it over. In one instance a man who was indifferent to this organization, would not take stock in it, would not at first contribute his fruit, but he has brought his fruit this year to the Exchange to sell. That to us is a very gratifying indication of what we are doing. When people outside will come and bring their fruit to us to sell, we are pleased. I may state that the way we have our labels is this, for instance:

FRUIT GROWERS EXCHANGE,

FENNIVILLE, MICH.,

STANDARD GRADE.

Medium size—two and a half in. Jonathan.

THE BANQUET.

The delightful social feature of the forty-second annual meeting of the State Horticultural meeting was the banquet, which was held in the St. Cecilia Hall, a musical institution maintained and carried forward by the music lovers of Grand Rapids. The rooms were hardly large enough to comfortably seat the two hundred and over guests who sat down to the tables, but this little inconvenience was overlooked when the delectable viands were brought on, one course after another, the epicurean value of which was well attested to by the hearty manner in which everything in sight disappeared.

Then followed the second feast—the feast of reason, and with it such a flow of soul as to make the occasion long to be remembered as a most enjoyable one.

Hon. Chas. W. Garfield was the toastmaster and no more need be said as to the character of the program, or the liveliness with which it was dispatched. After calling the audience together he said:

"In order to get us into a harmonious relationship with each other, we will have a little music by a quartette."

A Voice—No, a duet.

Mr. Garfield—Two duets make a quartette.

Then followed a beautiful rendering of "Still Lagoon" by Mesdames R. Maurits and Harold Nye, accompanied by Mrs. J. W. Brooks. To a hearty encore, they sang "Joy."

Mr. Garfield—We are meeting in a musical building, owned by musical people, and my reputation is in the hands of twelve people. The reputation is to get twelve toasts out in just 48 minutes. So if you will all come within three minutes it will add a charm, and the audience will wear a smile that won't come off.

The first on the program is a little reminiscence of the early days of this Society, by Mr. A. S. White.

Mr. White—I spent a few moments this afternoon in a casual examination of the report of the Secretary of the State Pomological Society to the Secretary of the State. It was dated December 31, 1871. An informal meeting of the fruit growers was held in Grand Rapids on February 11, 1870, when a temporary organization was effected by the election of Samuel L. Fuller to the office of president, A. T. Linderman, Secretary and E. U. Knapp, Treasurer; Henry S. Clubb, S. L. Fuller and L. S. Scranton were appointed a committee to draft articles of association. Jacob Ganzhorn, Wm. Voorish and James Hamilton were appointed an executive committee.

The first regular meeting of the Society was held in Grand Rapids

on February 26, 1870, when the articles of association prepared by the committee appointed for that purpose, were presented, discussed, amended and adopted. Article I read as follows: "The object of the society is to develop facts, and promulgate information, as to the best varieties of fruit for cultivation in the fruit regions of the State of Michigan, and the best methods of cultivation. It was a modest undertaking." The following named gentlemen were elected honorary members: William Adair, Detroit; J. J. Ramsdell, Traverse City; Townsend E. Gidley, Grand Haven, and Daniel Upton of Black Lake, Muskegon county. At this meeting the following officers were elected: President, H. G. Saunders; Treasurer, S. L. Fuller; Secretary, A. T. Linderman. All were residents of Grand Rapids. A corresponding committee composed of Henry S. Clubb and Daniel Upton was appointed.

On April 5th of the same year, a meeting of the Society was held in Grand Rapids. From the report of the Secretary, I quote as follows:

"President Saunders brought in a basket of beautiful fruit, among them very fine and rich specimens of the Russet and large and bright looking Baldwins. Henry Holt of Cascade offered fine samples of the Swaar and Peck's Pleasant. Mr. Houghtaling, of Grand Rapids township, exhibited large healthy, brown looking Baldwins, and a few genuine Roxbury Russets. Erastus Hale, of Grand Rapids, sent in a basket of bright red looking Baldwins. J. H. Ford, of Paris, brought a basket of brotherly-looking Jonathans, and some hardy English Russets. Rev. H. E. Waring, of Grand Rapids township, sent specimens of Baldwins, Roxbury, Russets and Tallman Sweetings. Noah P. Husted, of Lowell, presented a basket of splendid Wagners "attractive to the eye and delicious to the taste." A letter written by George Parmalee, of Old Mission, was read in which the writer suggested that a movement be inaugurated to secure the aid of the state in the promotion of the interests in Pomology.

Members were requested to relate their experiences with the specimens of fruit exhibited. Mr. Ford presented scions of English and Golden Russets. These apples were often misnamed although they were entirely different, as one could see by looking at the scions. The golden Russet limb is slim and light colored. The English Russet scion has a green and russet color. Mr. Ford's English Russets were hardy. The owner had kept them one year and six months. The English and Golden Russets were as different as the Baldwin's and Spitzenberg's. The English Russet tree grows upright and spreads. Mr. Ford's soil is light. The chief value of russets is their keeping qualities. His Jonathans kept well, but its chief value is that it was annual and an abundant bearer. There were always apples where there were Jonathan apple trees. Rev. Mr. Waring classed Steele's Red winter and the Rhode Island Greening as among his most profitable sorts in full bearing. His peach trees had not failed to produce a crop in fifteen years, although there had been a few seasons when the yield was not more than one-third or one-half more than a full one. He placed the early and late Crawfords and the Barnard at the head. In the markets he found



Cherry harvest in the B. J. Morgan orchard, in Leelanau county, near Traverse City.

that yellow peaches were sought for when white was a drug. Of the latter the large Early York, Stump, the World, and Crockett's White were the favorites. The latter was brought from New Jersey. It matures late.

The discussion continued to the close of the session, during which Mr. Holt said he had not been successful in raising young Baldwin trees, but had done well in grafting the Baldwin on old stock. The superiority of the Baldwin apple was due to its size, color, good keeping and cooking qualities and it would always sell. The Swaar did well on gravelly soil; on clay it was a failure. Mr. Holt favored the Wagner. Mr. Husted would not recommend the Spitzenberg, because after a few years it failed to perfect the fruit, on Michigan soils.

In peaches Mr. Houghtaling depended mostly on seedlings. He had shipped as high as \$700 worth in one season from 200 trees. Pears have proven a failure. As to apples he regarded the Baldwins as the best, the Red Canada second and the Jonathan third. On the subject of pruning Mr. Houghtaling said May is the worst month, March is the best and June is good. April is a good month in late seasons. Mr. Holt liked to prune in March best. Mr. Houghtaling said wax or gum shellac should be used to prevent bleeding.

A committee, appointed for that purpose, at a subsequent meeting, recommended the planting of the following varieties of apples. For market purposes; Steele's Red, Baldwin, Rhode Island Greening, and Wagner. For Summer use—Early Harvest, Early Strawberry, William's Favorite and Red Astrachan.

For Autumn—Porter, Jersey Sweet, Maiden's Blush, Gravenstein and Rainbow.

For winter use—Baldwin, Steele's Red, Wagner, Rhode Island Greening, Swaar, Esopus, Spitzenberg, Peck's Pleasant, and Tallman Sweeting. A long discussion followed the presentation of the report and at its conclusion the Society recommended the cultivation of the following varieties: For summer—Red Astrachan, Duchess of Oldenberg, Sweet Bough.

For autumn—The Maiden's Blush, Snow, Jersey Sweet, Cayuga, Red Streak, Fall Pippin.

For winter—Baldwin, Wagner, Rhode Island Greening, Golden Russet, Tallman Sweeting, Northern Spy and Hubbardston Nonsuch.

Mr. Garfield—"The Best Crop of Children"—Horticultural children—the human product—by Mr. C. J. Monroe.

Mr. Monroe—In these latter years we have heard a good deal about the conservation of the natural resources of water, of mines, of forests, etc., but we don't hear very much about the conservation of the human product; and in this work of the development of horticulture, we have not forgotten this side of the question, as witnessed today when those fine young men from our Agricultural College appeared before this body and discussed the various phases of agriculture and horticulture. They will be heard from again, as many others in the past have been, having gone out from us to occupy responsible positions in various parts of the country. We are proud of them, and they in turn are doing themselves credit.

I want to call your attention to Mr. Lyon, who has done so much

to help on the interests of this society. He was a practical fruit grower, writer, friend. His one whole aim was to do good, to better the conditions as they existed, never once thinking of himself.

Then there is another product of this Society, Prof. L. H. Bailey, now of Cornell. He was born on the adjoining farm of mine, so I have known him from his baby days—I recall his natural inclination to the study of birds and insects, and with his studious and pains-taking nature, it is no wonder that he has come to the front. And now as he comes back to visit the scenes of his early days, the credit for his high position, he invariably gives to the encouragement given him by the local and state Society.

Another product in the way of children, I wish to call your attention to what is perhaps the youngest human product. You know it is the practice among the Experiment stations to have two of a kind, so that if one happens to get harmed, the experiment will go on. And the influence has been so strong that over at our Experiment Station at South Haven, the good wife of the Superintendent of the Station just recently presented her husband with an increase of family—it was two of a kind—a pair of twins. (Applause.)

“Incidental Profits of Horticulture” was responded to by Mr. Franz, of Marshall, who stated that his experience in horticulture had been rather limited, but he felt that “Indirect Profits,” so far as his experience had gone, would have more aptly expressed his subject. But aside from monetary and educational profits, he felt that the greatest profit of all was the friendships formed with men close to nature, as horticulturists were.

Mrs. Chatfield responded to the toast, “Domestic Economy,” saying in substance:

I am glad to be introduced as a horticulturist's wife, and it is a great privilege to be able to speak from experience and that was my only knowledge. As I was thinking on the subject, the thought came to me of what resources we have as horticulturists' wives to set our tables. Sometimes it seems as though your husband's work has not brought in very much profit in dollars and cents, but when we think of the very little expense that is connected with setting our tables, in furnishing food for our family and guests that we entertain from the city, and who look upon our products with envious eyes, we can appreciate some of the saving there is in having such a source of supply. Indeed, one of the topics discussed by the city ladies, is how they can set their tables as well as the horticulturists. Think of it—every vegetable and fruit in its season, lettuce, radishes, brussel sprouts, strawberries, cherries, etc.—so fresh, so delicious, so tasty. It was my experience to move to town for a short time then I realized as never before how much we depended on our farm for our table supply. For days at a time, we did not go to the grocery for a thing—just telephone out to the farm, and we were supplied with eggs, milk, fruit, potatoes, cabbage, canned fruit of all kinds, jellies, pickles—there was nothing I needed from the grocery store. And that is the story that every horticulturist's wife can tell you—so we feel that we have all

we need and more of the good things of life and at a cost so low as compared with what those in the city have to pay for them, as to be almost nothing.

"The City Garden" was the topic of a toast responded to by Mr. R. M. Smythe.

Mr. Smythe—I am very sure that Mr. Garfield must have known that there was a sentimental strain in my make-up. I am a lover of flowers, and think they add more than anything else in the beautifying of a city. One of the most striking illustrations of this is the city of Hartford—there was a piece of land lying along the main street, very undesirable looking, but the property was bought by a gentleman who named it after his mother and set aside a certain amount for beautifying it, and now that is the most attractive spot in the place. Parks and flowers are what make the cities beautiful. There is an uplifting influence about flowers. You never see criminals lying around in flower gardens, and suicides are never there. The flower garden is one of the greatest educational factors in the life of a child. My little boy is only eight years old, yet he knows the names of all the common varieties of wild flowers, and I am spending more or less time teaching him the names of birds and trees and flowers and insects—it is giving him a wonderful fund of knowledge—something that will last him through his entire life.

"The Feminine in History" was responded to by Mr. R. G. Phillips, who said:

Mr. Toastmaster, Ladies and Gentlemen: Kipling says that when a man performs good works out of proportion, in seven cases out of ten, a woman is back of the virtue, and Kipling is right. Ever since the Garden of Eden, she has had it over man like a tent, and she is really at the foundation of all the wonderful progress of the age in which we live. Ever since then men have been working night and day, week-days and Sundays, to supply her with what she wants, and replace that which she uses. All of you remember the story of how Adam was found mourning one day just before lunch over the loss of that new green Sunday suit of his, and he said to Eve, "Where is my new suit?" "Where did you leave it?" Eve replied, "Oh, those lettuce leaves? I used them for the sandwiches." (Laughter.) Well, Adam had to get right busy and get a new suit, and he has been busy ever since. So, in the last analysis, it is woman that makes the world go round. She builds our factories, tunnels the rivers, plants our orchard and paints the red on her own cheeks as well as on the cheek of the apple, and whatever she tells you to do, you will do, because mere man is as nothing in her hand. She trims him, sprays him, cultivates and reclaims him; top-works a Ben Davis into a Northern Spy, keeps the fungus from his brain and develops the finest cultures in the garden of good works. During the day you men among men, go around like a roaring lion, seeking whom you may devour, but in the home circle you become Mary's little lamb, so tame that you will eat out of her hand, and so amenable to discipline that you will sleep in the woodshed if she says so.

Though I be shut in darkness,
 Or become insentient dust;
 I count oblivion scant price to pay,
 For having once known woman's holy love
 And a child's kiss.
 And for the little space been boon
 companions day and night,
 Fed on the odors of the summer's dawn
 And folded in the beauty of the stars.
 Dear Lord, though I be changed to senseless clay,
 And serve the potter as he turns his wheel
 I thank Thee for the gracious gift of woman.

Brothers, I ask you to pledge me this old, old theme and yet one that is forever new. Here's to our mothers, wives and sweethearts, and the ladies everywhere—God bless them.

Prof. Thos. Gunson, replied to his toast in a most felicitous manner, stating that the historical opinion of the previous gentleman and his did not agree. "for," said he, "you remember that our ancient, honored and primitive ancestor after she got the surroundings all to herself, she commenced, just as soon as she was '*Able*,' to raise *Cain*. (Laughter.) If you could go back and behold our primitive mother emerging from her dwelling place, and taking of the fruit of that tree, and passing it around, would you not be in sympathy with the fellow who gave way at that time?

But I want to say that these men and women who come here once a year to cross swords are the embodiment of this, which means horticultural progress. These industries remind me of an incident related of an Irishman who visited the British Museum, and as he walked through its many passages, he observed a figure with its wings and arms taken off, to signify or typify the victor, and as he tried to decipher the word at the base, he muttered to himself, "Begorry, I should like to see the other fellow." We have come here among other things to see to what extent you have suffered. But when these difficulties and tribulations and perplexities have passed away, then may you and I be invited to enjoy these regions, not in pearly streets nor streets of gold, but in the fields where the trees bear fruit like this, and surrounded with conditions such as my good friend Smythe has dwelt upon.

Mr. A. H. Hendrickson, spoke upon the M. A. C. impress upon Horticulture. He desired to thank the Horticultural Society on behalf of the students for the opportunity of coming up to this meeting and taking a small part therein, and of meeting such prominent men in horticulture. He thought through the army of graduates every year who went out all over the country from the long and short courses, a good work was done. These young men especially, who go out after four years of training, with their enthusiasm and knowledge, both practical and theoretical—when they join hands with practical and successful horticulturists, the effect must be a decidedly advantageous one. Their scientific training can not help but exert a beneficial influence on these with whom they come in contact.

"School Gardening," was the topic of a very interesting address by Mr. J. H. Skinner, the new farm manager of Kent county. He said that in his travels over the country, he was struck with the large number of people on the farm who were over fifty years of age, and

how very few young men there were. In one township 90% were above this age, and only six men of his age. This impressed him with the fact that Michigan was losing her most valuable crop from the farm, the young men, and he thought it was time that something be done to change the current of migration. So far as he had gone with the experiment, he had met with excellent success, although he did not have the cooperation of the school officers to the extent he would like. He enlisted in one experiment some thirty boys from 16 to 18 years old. The land they had was laid out by the surveyor in plots. "We were told that we could have this land to work, but that we must furnish everything with which to do the work," he said, and the boys went at it and worked with a will, secured what they needed, and the work was done with a will. This is the work, he declared, that should be done in every school, and he hoped the time was not far distant when from every school there would be practical instruction in agriculture given, and an effort, not only to keep the boys of the country on the farm, but encourage many of the city to go to the farm instead of remaining in the city.

Mrs. M. E. Campbell was called upon, and she responded to the toast "Trees of Memory" saying however, that she hardly knew just what to say. She could talk about the trees of history, of poetry—tell of the trees in the garden, the tree that is by the river of life, trees of experience—but the tree she recalled most vividly was the old Harvest Red Apple tree, among whose branches she sat in her childhood days and read the poems of J. G. Whittier, and so she thought she would recite a portion of one of those poems, "The River and the Tree," which she gave as follows:

Through a desolate course the stream had come,
From a spring whence its waters all timidly crept;
And its spirit was stilled and its lips were dumb
Though the passion of music within it slept.

But it came one night when the moon outsailed
The storm that had fretted her summer sea,
To the spot where waited with branches trailed
Like garments afloat, a beautiful tree.

Lonely in its own loneliness!
Lone in that loneliness lives must bear
Whom Beauty has made companionless,
But left them longing for something as fair.

And the current long wandering alone and apart,
Came close to the side of the Tree—at last!
So close that it gathered and held in its heart
The image of beauty the moonbeams cast.

And the Tree from the River's deep fountains drank,
And it gave to the stream what it longed for when first
It saw the sweet violets lean from its bank—
The love of a spirit for love athirst.

And thro' all the years and the years are long
Ere the tree shall wither, the river cease,
There swells from the waters the voice of song
There falls from the branches the dews of peace.

"Trees of Prophecy" was the title of a toast responded to by Prof. H. J. Eustace.

I am interested in the apple orchards and the spraying machinery and all these things, but I am far more interested in the crop of boys that we have in the college. It may look an easy matter to one on the outside to get up before them and keep them interested in a subject that is naturally dry and hard, but when you see these fellows responding in the way they do; when you see the people all through the state respond in the way they do, showing a real practical interest in the boys—this makes the work lighter.

We have a great many students that are holding high positions in horticultural work in various states, and with the very best fruit growers in the country. It seems to me that each class is just a little better than the one before it, as Prof. Tom Gunson said a short time ago.

Mr. Hendrickson referred a few moments ago to the kind way in which the practical fruit grower helps us out. We had thirty or forty boys out on fruit farms last year and they made good. One man said to me: "I want two of your best fellows next year," and another has asked for four in the spring. The spirit back of all this, the spirit of co-operation and confidence is what makes our work not only easy but interesting and pleasant. So let the good work go on, and we will do the best we can at our end of the line to maintain a high standard and respond to the calls with young people whose hearts are in the work and who will do the right thing.

Mr. Broderick, of Ontario, responded to the toast, "Our Responsibility to the Children Who are to Succeed Us."

I did not expect to make a public speech, for I am afraid that your judgment of me would be like that of an Irishman's. When President Lincoln was first nominated for the presidency, he began making stump speeches and struck a little town somewhere in New York state. The gentleman for whom Pat was working said to him: "I would like to have you go and hear this self-made man talk," and so he went. When he came home the gentleman asked him what he thought of the self-made man, and he replied, "I don't think much of his job."

Young men and young women, I want to say to you that for all that has been done for you, you owe a debt which you can never pay until you become fathers and mothers and raise a family. No child can pay the debt until he or she becomes father or mother and pass on to their children what they have been given by their parents.

Now, I am glad to be here with my friend Mr. Thompson. He pretends to be a Free-Trader, but he is not. Last year he wanted me to go to Massachusetts to their horticultural meeting and I consented. Then I went with him to Vermont and he coaxed this year to come to Michigan—I was not invited by your secretary—I came along to *protect him*. I tell you what he will probably tell me when we get to going home—he is an Irishman and I am an Englishman—and it is the story of an Irishman. After the South African war an English soldier was sitting on the streets of a town with his nose, one ear, one leg and one arm off. An Irishman walking down the street noticed this fellow, who was begging. He stopped and looked at him and threw a

crown into his hat, and walked on. Shortly he returned and threw in another one when the Englishman asked him why he was so generous. He replied, "It is because you are trimmed to my liking." (Laughter.)

Mr. Garfield—Ladies and gentlemen and friends: We have come within the hour and I thank all these good people who have responded so delightfully to my request, and I congratulate you upon having in your midst men and women who can speak so feelingly and so instructively. It seems to me that these annual gatherings in which we express ourselves pro and con in this way are the best part of the occasion, and no matter who the people may vote for, when we go over to Canada or when they come here, in a large sense, we all believe in reciprocity. I thank you most heartily and now we may consider ourselves dismissed.

HOW TO MAKE A SUCCESS OF PEACH GROWING.

HORACE SESSIONS, SHELBY.

Mr. President, Ladies and Gentlemen: Yesterday when I sat back there and saw that fine bunch of young men up here on the rostrum and listened to them give us such splendid short and pithy speeches on vital topics, I remarked to Mr. Bassett, "It would be better to call on them to take my part than for me to speak."

I don't know anything new in peaches—it is the same old story—almost as bad as the Irishman. It seemed that Pat had not had much experience in horticulture in Ireland; never saw a peach grown, did not know anything about peaches when he came to Michigan. But Mike had been telling him about the wonderful peaches, especially in Oceana county, and at evening Pat suggested that they take a stroll out and get some peaches. So they went out. The night was rather dark but Mike knew where the peaches were and so when they got to the orchard, he said to Pat: "If you want some good peaches feel around on the ground." He did so and finally found a peach, but there was a small hop-toad on it, but he ate it down just the same. Then he exclaimed, "Mike, Mike do peaches have legs?" "Of course not" said Pat. "Be-jabers then I swallowed a straddle bug." I know a little more than that, but not much.

I did not think how egotistical that would look in print. I do not think, however, I am so egotistical as that might give you an idea—not so bad as the story I heard the other day.

It seems that a man had a dream and he thought that he had passed over the Great Divide and arrived at the Pearly Gates. But he found Roosevelt had arrived there just ahead of him and was knocking at the Gate when he came up.

Saint Peter said "who's there?" And the voice called out, "Roosevelt."

"Ah, open wide the gates" said Saint Peter.

"How are you? Walk right in." Then Roosevelt said:

"Is there anything to do in here?"

"Yes," replied Saint Peter.

"Well, I don't want any ordinary job—I want something big. Have you anything big? What is the biggest job you have?"

"Well we need a leader for the choir."

"That's all right if you can give me a big enough choir."

"How many do you want?"

"I want a million sopranos, a million altos, and five hundred thousand tenors" and Roosevelt stopped.

"How about the bass?" said Saint Peter.

"The bass?" said Roosevelt, "Oh, I will sing that myself."

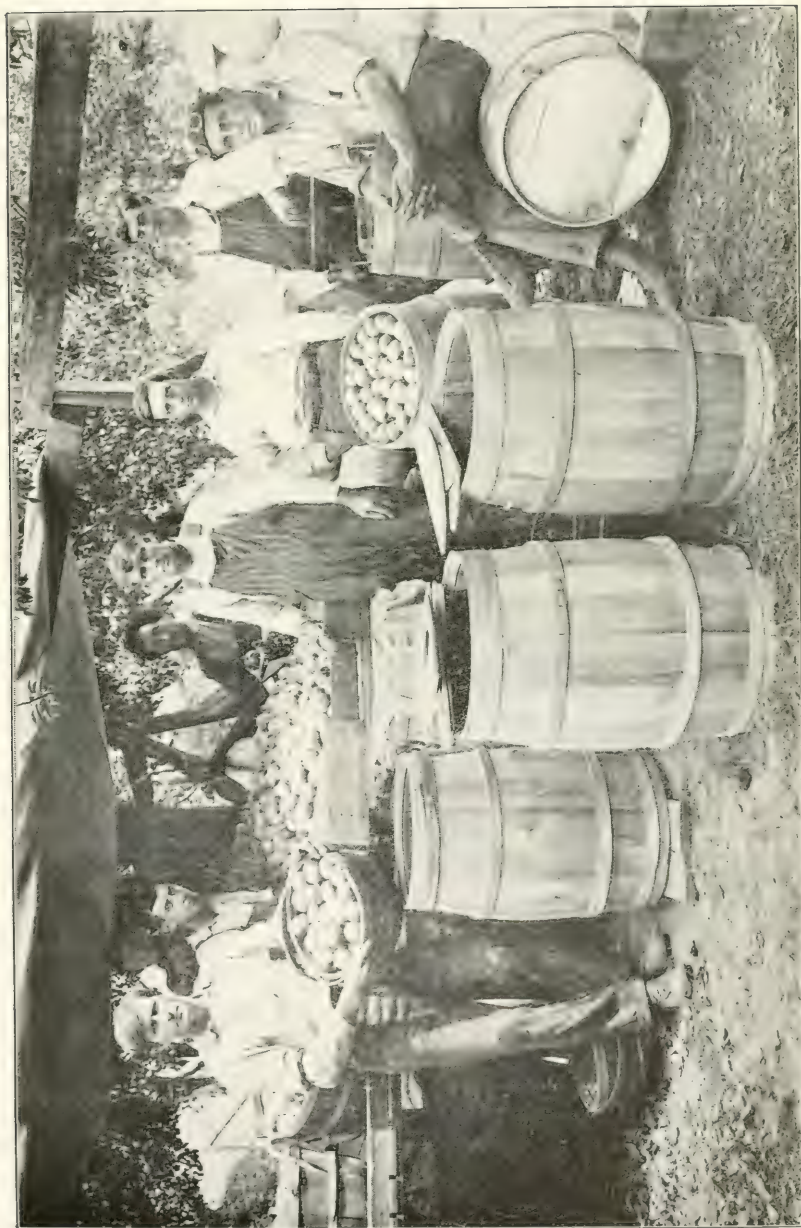
My wife remarked to me a few days ago, "Horace, you have not written your speech yet." I said, "I know it and I guess I won't write it—I will just tell them off-handed what I know which is not very much." So here goes.

The first thing that should be considered in peach raising is the man. The most important thing that goes with successful peach raising is the man. The man must love the business. That is all vital. A great many people have come to me and said: "I believe there is money in raising peaches in Michigan and I would like to get in the game, but I don't like peaches, I never did. I hate to work around them, I like to harvest them. I am on a dairy farm and would like to make a little money, and I think I can do so out of peaches." Well, what I have to say to these people is: "In all probability you will make a failure. The man must be enthusiastic. No half-way business will go. There is something about Horticulture and the growing of peaches especially, that requires enthusiasm. If you have plenty of enthusiasm, it seems to enliven your help and your neighbors and everybody, and things go with a vim.

Another thing that is needed is self confidence. I don't mean by that egotism or conceit. But still of the two I would rather see a man with a little conceit than to have no confidence in himself. You will make a very poor success if you have no confidence in yourself, but you cannot make anyone else think that you have ability when you are all the time deprecating yourself.

Another vital thing is personal touch. It is possible for some to make a success of raising peaches and live ten or a hundred miles away from the orchard, and go there only occasionally, provided they get the right man. But in my own observation I believe that very close to ninety per cent of those who raise peaches by proxy will make a failure. But I believe that the peach business especially requires you to be "Johnny on the spot," ready for any emergency and pay close attention to the details. This detail work is very, very vital in horticulture and especially in the raising of peaches.

Then there is the question of location. If a person were going to build a good house, he would want a good location, sightly, well-drained, etc. In planning for the location of an orchard we have to take into consideration the land, the nearness to a large body of water—we had a little on that line yesterday—but the all important thing in planting the orchard is to put it on the ground where the orchard will stay. The orchard is not something which you will plant today and in four or five years, pull it up. When I plant a peach orchard I am planting it



Packing crew of Geo. M. Low Co., Bangor, Mich. This crew packed 1,500 barrels of Duchess from one orchard in 1911, packed in one grade, and sold for \$3.60 per barrel.



for at least twenty-five or thirty years, perhaps longer. Then I want that location should be where the trees will be as immune from frost as possible. Then you recall the question came up yesterday as to whether a fair location close to a railroad or a good location considerably back would be the one you would choose. My advice would be emphatically to take the location back, because if you have not got the fruit you can not market it. If you do have it and it is not back too far, you can get it to market. The vital thing is to get the stuff; the rest you can take care of.

One thing that has knocked, as a horticultural state as much or more than anything else is the advertising and exploiting and selling of lands by real-estate men for fruit culture that are entirely unsuited for that purpose. Michigan is the grand old state for fruit—no question about it—I don't mean that every inch of land in Michigan will raise peaches. There is only a very limited area that is really good peach land. I honestly don't believe that there is over one acre in a hundred that is exploited or sold for good peach land that is even half way fair, and especially the more tender fruits, such as peaches, and the one great orchards in unsuitable locations.

If you are going to build a good house, the most important thing would be to put it on a firm foundation so that it would not be destroyed by the elements or blown down in time of a storm. So it is with the orchard, put it on a firm foundation, and then it will give you paying crops for twenty years or thirty years. I have seen peach orchards forty years old in Northern California, still in a thrifty condition.

Another important thing is the setting of the trees. Some make the mistake of getting the trees in the ground wrong. That is possible, especially on rolling ground. You may get them in deep enough. A peach tree should be put in, even on level ground, two inches below the surface, and on side hills it should be six or eight inches. It is safe to put them in deep. More trees are lost by being planted too shallow than too deep.

As to the distance apart, our own orchard is planted twenty feet each way. If I had the thing to do over again, I would plant at least 25 feet one way.

As to the growing a crop between the trees, there is quite a diversity of opinion. Many advocate in our farm papers that the land should be first cropped for two or three years to get it in a condition for setting the trees; but my personal observation has been that in most of our soils in Michigan, the ground is none too good at its best—there may be here and there a spot that is very rich that it would be a good policy to crop it, but in nine cases out of ten, the thing to do is to put in fertilizer and give the tree a good start. But if you have land that will grow 100 bushels of corn or 200 bushels of potatoes to the acre, it will pay to put in a crop two or three years.

As to cultivation I presume we are considered as sort of a crank, but we do a lot of cultivation and we start it early. It should be started about the time the buds begin to swell and the growth starts, and stop early. Late cultivation has ruined many a prospect for the coming year, and perhaps for coming years, by making too spongy

growth in trees. Begin the last of April or the first of May and stop the first or the middle of August. We cultivate usually about twice a week. Then we have a disk—an ordinary straight frame disk with an extension top—so that in driving cornerwise through the orchard it just fills the row and throws the dirt to the trees and reversing the disk, draws it from them. In this way you can cultivate an orchard that is trimmed low. Our orchard is trimmed low. (You noticed in the photo that was shown you yesterday that this is so.) We go over about eighteen feet. The horses walk in the middle of the row and in this way no peaches are knocked off. One team will go over twenty or thirty acres a day.

In such seasons as last year when it was so dry, we harrowed every other day, every foot of ground, and we did not suffer any from drouth. Moisture was everywhere to be seen.

Then there is the trimming. It is not necessary to say much about trimming young trees. Just cut them off two feet above the ground. If the shoots are thrifty, we leave one or two limbs with one or two buds on. Do not cut too close to the tree or you may destroy the bud close to the limb.

Later on, in the trimming of the tree, form a well balanced head with three to five strong leaders, and up to the growth trim symmetrical, then when they get older you can do some trimming. We have a 10-acre block of trees, twenty-three years old and we pick one-third of these right from the ground and every peach can be picked from a fourfoot ladder and not do any reaching. The balance of our bearing orchard is 16 years of age, and they are all the same size.

As to location we have a block of twenty-three year old trees that stand on the highest part of our farm and have borne continuous crops since they were four years old or nineteen consecutive crops, that has made possible by leaf trimming for one thing and giving it plenty of growing wood, so that no tree is allowed to overbear. The main thing is not to allow the trees to become sappy or have a spongy growth. Even there was a fair crop of peaches on these trees.

As to varieties, I would not want you to have any of the varieties that I have. Twenty-three years ago, we did not have the same ideas of what was the right peach to raise or sixteen years ago. The forty-acre block is set with our yellow peaches. We like the New Prolific pretty well, Kalamazoo and Elberta. We have quite a lot of Gold Drop peaches. They made us as much money as any trees we had in the orchard. We have Gold-Drop trees that have yielded us nine or ten bushels, and one year they sold at \$1.75 per bushel,—that is at the rate of about fifteen hundred dollars an acre,—and that compares very favorable, I think with the Westers stories that come to us. The Gold-Drop is good if not taken too far north. Perhaps the Elberta is King of them all.

Well, I don't know but I have told you all I know on this subject of peach growing, and it can be emphasized and summarized in the three points, first, we want the right man in order to make a success of the business, and we want to get varieties that the public demand, lastly a suitable location, and then there is no question but what any man will certainly succeed as a peach grower in Michigan.

DISCUSSION.

Question—Did you get any peaches this year?

Mr. Sessions—Yes, we had in round numbers about eight thousand bushels.

Question—Are you bothered with the yellows?

Answer—No, not seriously. In our orchard we have about ninety acres and this year we took out four trees only.

Question—Are you troubled with little peach?

Answer—Not this year but last year we took out about a dozen. I have not heard of any Little Peach in our neighborhood.

Question—Do you think that certain varieties are more susceptible to Little Peach than others?

Mr. Sessions—In regard to that I cannot say. In our own experiences we have lost more Gold-Drops by Little Peach than any other variety. Possibly they may be more susceptible. Perhaps it may be that in the Gold-Drop block they were in the side of the orchard where the Yellows and Little Peach came in. There are no bearing orchards north or south and all the disease came from the east and the Gold-Drops are located along that territory. As I said, we lost more Gold-Drops than any other variety.

Question—Have you noticed that some years when the Yellows were not very bad?

Mr. Sessions—Three years ago, we took out 34 trees, that is the worst we have had the Yellows in and around our vicinity for nine years, but we were not obliged to take out only three or four trees on the start. I have sometimes thought that Yellows were worse in varieties where the blossoms open up wide.

Question—What about cover crops? Did you use them?

Mr. Sessions—That is a subject by itself. We like sandvetch and rye. It is impossible almost to put the whole orchard into vetch and rye for it makes us much work and we aim to get over the orchard at least once in three years. With rye and vetch and a portion of it every once in three years; intervening years we plant crops, we always have cover crops.

Question—Do you get growth enough to put it under early?

Mr. Sessions—Yes, we begin plowing when it first starts to bloom and when we get through plowing—it takes a week or ten days—it is getting a little old, but we never had any serious results from being too dry. The ground worked thoroughly after it is plowed under.

Question—Do you roll?

Mr. Sessions—No, but we go over with a disk or spike tooth harrow. It is pretty hard to get a roller under our trees.

Question—What is the nature of your soil?

Mr. Sessions—Sandy loam with clay sub-soil.

Question—How is the best way to destroy borers in peach trees?

Mr. Sessions—We don't have any serious trouble with borers. We take them out with a knife. When we get through trimming about the first of June we go over the trees, dig the dirt away, examine for borers and then leave the opening open and then go over again in two or three days and kill what may be found. We never saw any advantage in heading the trees high. The borers just went up in the limbs. We

took the borers out right after trimming, possibly about the first of June and then leaving the holes open around the trees and in about two days we go over the work again and where we can see signs of the working of the worms, we investigate and in this way we get practically all of them. Then the hole is filled. Perhaps I cannot convince some of you that the borers that work up in the limbs are the same as those that work in the roots, but they are the same.

Question—What is the difference between the saw-tooth and the ordinary borer?

Mr. Sessions—I am not familiar with them but we have not been troubled with them to any extent.

A Member—I assume that Mr. Sessions sprayed first with lime and sulphur solution. How does he manage to prepare his solution?

Mr. Sessions—I cannot give you any light on this. We spray our trees early in the spring with blue stone for curl leaf and we have not been troubled with brown rot or kindred rots and never spray for leaf rot. This is the first year that it has ever been serious with us at all. I think I will experiment with at least a portion of the orchard with lime and sulphur.

Question—How cold was it last winter up there?

Mr. Sessions—I believe it was about twenty below zero—all the way from eight below to twenty above. I was not at home at the time so cannot tell you definitely.

Question—Are the borers the cause of the gum that comes from the trees?

Mr. Sessions—Sometimes the gum may exude from the tree from injury or freezing or other causes, but if the borers are working the gum will exude.

Question—Is it possible to disk a cover crop of rye and vetch instead of plowing?

Mr. Sessions—Yes, it is possible, but if your orchard is in shape to plow you can get it in nicer shape. It is not so satisfactory as plowing the ground.

Question—Your orchard is 24 years old, how many trees have you lost to the acre?

Mr. Sessions—I should say perhaps about one-quarter of them. We have reset all of these. There are perhaps twenty-five per cent of the original trees that are at present gone.

Mr. Chairman—The discussion of this question is to be led by Mr. Oscar Braman of Grand Rapids who will now take the floor.

Mr. Braman—Mr. President, I am just played out and have been under the weather for the last couple of days and I haven't really prepared anything very definite for this occasion. What few remarks I do make will be informal, but the ground has been so very thoroughly covered by my predecessor, Mr. Sessions that I don't know as I can offer anything very new at this time.

Our experience in the growing of peaches—we did not have very much success in growing peaches this year—we had zero weather for three weeks and from that down to 20 below, and we didn't expect to grow a bushel of peaches this season, but to our amazement, we had a few hundred bushels.

One thing of importance in growing peaches is to get an ideal location. We prefer to have a location which is high and well drained, a north to eastern slope, although we have some of our orchards located on a southern slope, and they usually did very well, but occasionally we get a winter when the sun will melt and the wind will blow off the snow and then we have trouble with "root freezing."

The first consideration is to have a location which is above the other fellow's location, the highest you can get, with a gradual slope, although one of my best orchards is on a level plateau. I like a loam soil, underlaid with clay-subsoil, although our orchard varies from a sandy loam to heavy clay and we plant the varieties according to the condition of the soil.

In the next place we must not have a location where the water stands or where the land is springy. Where these wet spots are you will find that the yield will be poor and the fruit will be liable to drop off before its time.

As to fitting the ground for the trees, I like to plow under a good heavy clover sod, or sod of some sort, and I believe in supplementing with commercial fertilizers. One of the best orchards I ever grew, when we planted the trees after we plowed under a heavy clover sod, and another that was very successful was where we plowed under a heavy crop of June grass. It had not had a load of manure for fifteen years previous to the planting of that orchard and developed into being one of the best in Kent county.

As to soil I think a sandy loam, or clay loam, underlaid with red clay.

A Member—Do you under-drain when you set your orchard?

Mr. Braman—We have had some under-draining, but none of our peach orchards are under-drained. In our location the soil that needs under-draining is unfit for peach orchard lands.

A Member—You let the other fellow do the under-draining.

Mr. Braman—Yes. This orchard we fall-plowed just before Thanksgiving and then the next spring set out the trees after thoroughly fitting the ground and planted corn in between. And then we went and gave that land an application of 300 lbs. of fertilizer to the acre. I grew the best corn on that piece that I ever grew in my life. Last year, a year ago, we sowed some sand-vetch and we had quite a crop of sand-vetch. This last year we plowed it under. My men are not very much in love with turning that stuff under. We discarded it this season and used clover more. Perhaps we would not have had so much trouble but I think we did not get at it soon enough and then I think another reason that made it so hard was that it got so dry.

Now as to the varieties that you should plant. This all depends upon the market which you cater to—whether shipping your fruit or disposing of it in a local market. Personally, we have two classes of markets to deal with, local and the shipping market. For shipping we use such varieties as the St. Johns of Michigan, Engles, Elberta also some Gold Mine, but for local trade we start in with the Deweys which has been one of the best money makers here in Grand Rapids. We have had from two to three dollars a bushel for these peaches every year. It is the only one we had to thin this year. We followed up with the

other varieties, Elbertas and Oceanas. This last is one of the most profitable for shipping that we have had. We really have not had Oceanas enough for our local market. The public is just getting on to the fact that the Oceana is about the best peach that we have. Personally, I think it is the best, quality considered, surpassing the Barnard and Crawford. The grocers are calling for them very generally. We are also planting the Gold Mine. This is a very good peach and they bushel up very fast. However, there is one objection to them, some years they will shell or drop off before they ripen up. I cannot understand just what the trouble is. I think, however, that it is due to the effect of scab, though I am not sure of this. It seems that wheather conditions will cause peaches to drop. They are something like the Barnard, years ago, with which we used to have this same trouble—a long continued cold spell just before ripening, and then comes on the sunshine and they fall to the ground. Some seasons we are not troubled at all that way. Otherwise, the Gold Mine is one of the best peaches we have.

The next important thing that we should consider is pruning. We like to form our heads from about 20 to 36 inches from the ground. We leave from 3 to 5 limbs scattered on the southwest and west sides of the trees. We cut back every year from $\frac{1}{4}$ to $\frac{1}{3}$, all depending upon the growth of the tree. Sometimes we cut back on the east more than others. We throw the top on the side of the prevailing winds.

A member—Do you prune in the fall or in the spring?

Mr. Braman—Our young trees, we set in pruning just as soon as we get our work in shape to do it, but bearing trees we do not do anything with until the 10th or 15th of March. If the buds set heavy, and they are not injured, we feel it is all right to go on and do our pruning. If the buds are thin we do not do so much pruning unless they are all killed. We did not do much pruning on our bearing trees because the buds were so few we did not want to sacrifice the crop. We will start in a couple of weeks and get the dead wood out, which with us is considerable on account of last year's freezing, and then finish early in the spring.

So far as apples and plums are concerned we would prune any time now. The next important thing is the question of spraying and I want to say that this is a very important factor. About five or six years ago the scale got scattered throughout our orchards. We went at it and thoroughly sprayed the orchard with sulphur and lime, one man with one hose on the tank and the other on the ground spraying up, and we practically got the scale under control the first season, and we have not had scale in our orchard outside of two apple trees which I lost this last spring, but not much of the fruit was affected.

One of the most important features of successful peach growing is the successful spraying of trees. We have made our own sulphur and lime up to the present time, although I would not hesitate to use the commercial product. We soak the trees so that the spray will run right down the bark. You never want to do a half-way job in spraying. If you do, it is time, material and money thrown away. The first spraying for scale will destroy the "curl leaf" then following that spray again with the second spray just as soon as the shuck falls from

the peach with the cooked sulphur and lime spray. We made it 15 of sulphur, 15 of lime, to the 100 gallons of water. You know how that is made. That is one of the most effective fungicides for the control of the peach that we have. It is safe, it is reliable, it prevents the scab from the peach and also prevents rot and we have not had any trouble in burning the leaves where it was properly made and put on. We also make two sprayings, one when the shuck drops and then three or four weeks after. One month before the marketing begins we use another spray and by this method we are quite successful in keeping the rot from getting much foot-hold on our peaches. Three sprayings is all that we use on our peaches. In the second spraying we put in arsenate of lead to control the curculio, but in the last spraying we not use it.

In regard to thinning and cultivation—we do so by plowing our orchard with a gang plow, three or four inches deep then follow with a spring-tooth harrow with a stirrer, and we level our orchards and then after that we use a 90-tooth three-section harrow. We have been successful in keeping the orchard in goon condition for we go over it with a gang plow and spring-tooth harrow and level it down. The moisture is absorbed and the trees are kept in very healthy, growing condition. I advocate a very thorough thinning, taking all poor fruit and leaving only as much fruit as the tree will profitably support.

We market herein half-bushel and bushel baskets. Our fruit is all packed in the orchard. We don't take to the packing house. We have men right in the orchard who do the sorting of the fruit so you see it is really handled but once. And by thorough pruning and spraying, and thinning we eliminate all the culls.

A Member—Are you troubled with rabbits girdling the trees, and if so what do you do?

Mr. Braman—We have never been troubled with rabbits at all, but last season for the first time to any extent, we had difficulty with the short-tailed mice. We lost perhaps 60 or 75 trees from one to three or four years old. Not having had any experience with them before I did not know just what to do. I think, however, we will mound the young trees high up and then if they are gnawed there will be body enough below to start another tree. There are various precautions that are had but I am not familiar with them. A neighbor of mine had some experience with rabbits. They began gnawing the trees and we took linseed oil and ground-graphic and applied it in the form of a paint to the bodies of the trees and it seemed to have the effect of keeping the rabbits away.

A Member—When does your Gold Mine ripen as to your Elberta?

Mr. Braman—It follows right on the heels of the Elberta. We begin picking it just as soon as we finish picking the Elberta.

A Member—At what age do you try to have your peach trees bear?

Mr. Braman—Just as quickly as possible.

PROBLEMS THAT CONFRONT THE MICHIGAN FRUIT GROWERS.

PAUL ROSE, ELBERTA.

Mr. Chairman, Ladies and Gentlemen: It is a very easy matter to suggest problems, and it is not at all a difficult matter for the practical fruit grower to propound them, but what we want here is someone who can solve them. This is what we are up against—we want some one to put his head above the horizon who is able to give us a satisfactory solution of the many problems that present themselves to us as horticulturists. I will try to note a few of these problems that I have had to deal with and will tell you how I tried to solve them.

First, the matter of location. There are many horticulturists who know that they are wrongly located; they did not know it, however, when they bought their land from the land agent. Now, ought they to go on and continue on this place, or will it be better for them to get out of there and go where the location is more advantageous? My advice would be to sell out, or even give away your land, rather than remain there and waste your years and money in a location where you will never make a success of the business.

You have heard discussed quite fully this far, the proper requirements of an ideal fruit, and especially peach location. How will you find that place? Well, get the best information from those who actually know. Don't take the advice of real estate men who have no object excepting to exploit certain lands and dispose of them at exorbitant prices. Consult men like Mr. Sessions and others who have made a success of the business. Don't be in a hurry to decide the location. Get all the information from all the good reliable men that you can, then act on your own judgment, based upon their advice.

Up in our neighborhood there are a great many red raspberries grown. You see we get onto the late markets when this territory here is out of the way. Now, on every farm there are acres that are adapted to growing raspberries and there are acres that are not adopted to their growth at all for instance, there was a man in our country who had berries on one side of a slope for which he would receive as high as three dollars a case for his first grade. This was on a north slope on heavy soil that was naturally a little seepy—that is, rich raspberry land. Well, on the other side of that hill the land was dry, and other conditions seemed to be all right and he thought "What a beautiful location for berries?" Not at all! You see it is all a matter of location as to where you pick your ground for red raspberries. Now that latter place would have been good to plant peaches on, but it was not good for red raspberries, and it proved to be so. It is just so with cherries, and peaches, and pears—the location has all in the world to do with whether you make a success or a failure of the work.

Shall we go off here one hundred miles and plant an orchard—as I have done sometimes, and as others have done, to their sorrow—



Edward Hutchins, of Fennville, in full orchard attire.



T. A. Farrand, of Eaton Rapids, and a nine-year-old Stark apple tree, grafted to Northern Spy, one year's growth of scions.



Roland Morrill, of Benton Harbor, enjoying the summer orchard meeting.

this is a question that confronts many of these young men who are planning to start out for themselves in the fruit business. This is a problem which no one can answer except the one who is solving it. I can answer it for myself, but I cannot do so for these young men—they must answer it for themselves. But before they answer it, let them study the question carefully, let them get all the good advice from experienced growers, and then, when they act it will be with their eyes open, and the probabilities are that they will make the right move.

A gentleman a little while spoke of an orchard being planted on high land. That won't do in this north country. Cherries may stand it, and perhaps apples, in these locations, but it would be better to get on the slopes out of the way of these winds. Just over the hill, no farther than the length of this church, may make a difference between success and failure. It is on the slopes that we have the frosts most apt to stay off the land, more than on the tops of hills or in the valley. We know by experience. The cold weather in some way or other runs down and the warmer air goes around—just how it happens I am not prepared to say, but I know it does happen, and that is all there is to it, and that is what we want to recognize.

The soil has everything to do with the location of an orchard. These gentlemen have exhausted this part of the subject, the climatic conditions necessary for a successful orchard have been quite thoroughly discussed. Mr. Sessions, who has had crops of peaches for over twenty years on the same land, thinks his climatic condition is just what it should be, but you could not do what he does here at Grand Rapids. This question of atmospheric drainage and climatic condition, is a question that is not as thoroughly understood nor are we able to tell all about it as we would like.

A Voice: Could you pick these out?

Answer—I could in our own country, I think, but I could not go out around here in a livery rig and pick them out.

A Member—I am going through a new section, could you before you knew that these climatic conditions existed there—have you any information that would enable you to tell just what they would be from looking over the location?

Mr. Rose—You must take into consideration where you are. The climatic conditions that obtain in the West are not the same as here. In Michigan they are just about the same a certain distance from Lake Michigan. You cannot go far inland from Lake Michigan, and find land that will not be very much different from here. So you could not depend with absolute certainty that certain conditions would be sure to obtain. But where we are, three miles from Lake Michigan, we have not had a failure for twenty years. We had an enormous crop of Crawfords this year, larger than any other year before.

Now another point that must be considered, and that a man must know about, is the shipping facilities. Don't go away back so that you have to haul your fruit too far. The price of land does not cut so much of a figure as does the location—getting out your fruit—getting help in to assist in picking it—these are vital questions.

A Member—But suppose that such a place was the only one you could go to, to get a location, such as you wanted?

Mr. Rose—But there are other good points and plenty of good land in Michigan, that will raise peaches and other fruit. And as to the marketing, I just believe that an up to date man will do better not to be too far away from his markets. Right around Grand Rapids you have one of the best markets in the United States.

You have the scale and some diseases here—there is no scale with us, neither Yellows or Little Peach, but we do have the curl leaf. We are right on the spot and welcome them with the spray pump as they appear.

A Voice—Do you mean the Yellows and the Little Peach?

Mr. Rose—No, I mean the scale and some other diseases.

A Member—Do you have the aphid up there?

Mr. Rose—A very little, in the neighborhood, but not very much.

The question comes up to everybody, what shall I plant? Where shall I get my trees—from whom shall I buy them? These are vital points. My advice is that you go to the nurseries that you know something about. Do not buy trees because they are cheap, and do not buy trees from an itinerant peddler.

As to varieties, that has been discussed quite freely here. Everybody is quite well posted on varieties. Pears are one of the best fruits that we have for profit, and the Bartlett is about the most profitable of them all. I also get good results from the Seckel.

There is a new peach that will be boomed this next year, which is called the J. H. Hale. It is claimed for it, that it is better than anything that has yet been put on the market. Mr. Hale is a prominent man and would not advocate anything that he did not think was all right. It seems that he found this peach in a block of early peaches in Georgia. He claims that it is one-third larger than the Elberta, more productive, better color, better carrier, has no fuzz, and this year in Connecticut, where all other varieties had nothing on, the J. H. Hale had a fairly good crop. I believe we ought to test this peach out and if it is all right, we will be in the front line. I do not believe in buying everything that comes along, but on the strength of Mr. Hale's statement, I think we would be justified in giving it a trial.

Another question that comes up and over which there is considerable discussion and difference of opinion, is the distance apart that our trees should be. I am a crank on distance. I think there is more damage done to the fruit interests by growing the trees too close together than from any other cause. Our soils are not good soils. We have a rather light soil compared with other soils. We cannot grow peaches as they grow them in Southern Ohio and Southern Indiana. We cannot put the size or color into them that they get there, but we can by putting our trees further apart thinning and pruning them, and giving them plant food, enable them to produce a better apple and a better peach and better other fruits than they would otherwise produce. I have planted cherries 40 by 20 feet, and we have been cutting off the limbs every year. They should be 30 by 40 feet. We would get more out of them than to have them planted so close together. With us, we receive more money at the canning factory than any other grower in that country, more than the western fellows got for their cherries in the West. I had a fellow from the Agricultural College of Wisconsin working for me and he went to the North Yakima country, and

he reported that they only got a cent a pound for these cherries, so the growers who picked and packed these cherries lost money. We receive six cents a quart while the other fellows around me got only four and a half, so you see I was much better off. They will continue to come in year after year with their cherries, but I do not think that we will be obliged to cut our orchards down, and my advice is, to stay right in Michigan and grow our own fruits.

The tree disease is another problem. As I said before, we have a very few of these diseases with us up in the north part of the state. We have the leaf curl and that is about all. We have never solved the Little Peach or Yellows question, how to absolutely control it. The only way we have done is to pull out the trees and burn them, and thus keep our orchards in good shape. Of course, there are many men who will not do this unless the Commissioners make them do it. We do, however, have one thing in the north that is on the sour cherries, a new disease—the trees perfect their foliage and make a good growth, and there appeared on certain of the limbs a small nodule. The cherries grew and formed all right, and then they turned yellow, and did not grow any more. They had a brownish tinge to the meat. The cherries did not drop off. These cherry trees that were affected—only three in my orchard—are worth one hundred dollars each, but I will pull them out and burn them, and so will not take any chance.

Spraying. I want to say a few words about spraying. I will tell you of one thing where I think we fail, and that is, in thorough work. Few horticulturists ever do as thorough work as they should. Not alone in spraying, but in other ways as well. You can go into an orchard late in the fall and you can tell where the good and bad work has been done. In our neighborhood there is a man who has a cherry orchard which he declared he sprayed just as Rose told him to do. But he did not. On the outside the leaves were all right, but on the inside of the tree where he failed to get on his copper sulphate solution, the foliage was not properly sprayed and the results were as might be expected. You cannot grow a successful fruit crop the year that you get possession of a farm. A successful fruit crop should be grown two or three years in advance. You must have a foliage that is so good and a tree so healthy that it will store vitality sufficient to grow good fruit. Apple trees should have their foliage on now. They should be full of foliage like the white oak grub, and this can be if proper spraying is done at the right time.

Another of the problems that confronts many of us is the getting of men who will do good thorough work. It seems strange that when men are paid a good price for their services that they are not willing to give value received. They have never learned to be careful, to take an interest in things, and care for the work left to their hands as if it were their own. Indeed, I don't know as they would do any different if it was their own. They have evidently lacked an early training, but it is a fact that only a very small proportion of those whom we employ can be trusted to do the same when you are not with them as when you are on the job to inspect all their work.

Another problem that we are up against is the matter of the fertility of the orchard. There is not very much manure made on a fruit farm. We can ship in stable manure from Chicago and some other places.

Some use cover crops and commercial fertilizer. I am doing this. Just at present I am paying \$16.70 a ton for sheep manure from Aurora, Ill. Will it pay to ship in stable manure to this territory. It is my judgment that it will. In this connection there is one thing that I want to raise my voice against, and that is cropping the little orchard. Don't do it at all. If you are going to grow fruit, then grow fruit or get out of the business and get a job in town.

A Voice—Were any of your trees affected by cold weather last year?

Mr. Rose—We lost no trees by the freeze, but there was considerable frost. These trees are not Michigan trees, but are from

A Member—What about thinning peaches?

Mr. Rose—I was about to speak of that. Many do not thin near thorough enough. I took four trees this year, two on each side. Wealthy apple, and pulled off three-fourths of the fruit on two of them, and the other two were not thinned at all, and when the apples were gathered in the fall, and it was found that the apples from the trees not thinned, amount to little or nothing, are not marketable, while those that were thinned have on them a good crop. This is due wholly to the thinning. I am convinced that if we would think more we would get better and more satisfactory fruit.

A Voice—Would you thin an old Baldwin tree?

Mr. Rose—I would thin any tree, if I wanted to get good fruit. The greatest problem we have in our territory in Michigan, is the slack grower. He is damaging us. He sells apples that are poor, and they go onto the market and peddlers buy them, and sell them out. You say that this does not interfere with the sale of good fruit, but it does. The question we are up against is, how are we going to get these fellows who do not grow good fruit, and who do not attend this meeting, to do as they should do? We have men in our neighborhood who have become bankrupt growing fruit. Then there are others who are growing rich following the same pursuit. One does thorough work, attends to little details of business—the others spend every Saturday in town—and I want to say right here, that if this Saturday was put in on his work, his orchard would have looked better, and you would not find him down in the town looking for a job in an automobile factory, as he is now.

Then comes in the marketing of fruit. The large grower is not dependent on an association, for he is in a class all by himself. A great many people have built up a market, and they are doing fairly well. Still, it is a problem, I cannot answer. What experience I have had with associations in the west has been fairly satisfactory, but in general, I do not like the association idea. Some of them are holding back while others want to go ahead. If we could get in a location where there is a body of men together like those of Northport, where they will work together, I am sure it will be better for them than to work separately. I think the better way is to have a packer go to the fields and pack the fruit.

Then there is the western and southern competition. We all know what this is. They put into the little towns all over these cars of fruit and they are so thoroughly distributed that the market is very well supplied with Georgia, Arkansas, and Texas peaches. They were quoted to them and delivered to them this year on track at \$1.25 to

\$1.50 per bushel to the dealer. He turns them over to the grocery man at a very small profit, and the public is supplied with all the peaches it wants before we get in. This has been also true to quite an extent with apples. Now, how are we to meet these fellows? Send the cold winter down that way, freeze them out! But the railroads in the south and in the west have sent their agents all over this country and are selling thousands of acres of land through the means of literature and other means, that are to be planted to fruit that will shortly come in competition, and now with that system built up, it looks on the face of it, as though Michigan fruits especially peaches, will not be in it at all. The cellars are filled with canned fruit from the early peaches of the South. But this is working against the southern grower as well as us, and in Georgia they are cutting down many orchards of peaches. One man whom I know, has a son acting as a distributor for him of one of these big Texas deals, said to his father, "Father, don't you put another dollar in that peach orchard enterprise, for if you do it will be lost!" The fact was, they lost money on every car of peaches that was shipped out from that great syndicate of peach growers. You also read many wonderful things in the literature from Arkansas as to what can be made out of peaches, but there they have not cleared but a very little over expenses the past year. I wrote for data for peaches, and this is the reply I received.

"Dear Sir: Your favor of the 5th inst. received. The past season has been very disastrous * * * *."

I have another letter from Cincinnati that tells much the same story. I will not take time to read that here.

Well, we have these problems before us, but I believe that they will solve themselves and to a certain extent take care of themselves. What we want to do is to do better work, to take care of our orchards more thoroughly, build up a reputation for our own individual work, which we can do if we do as we should. Of course we have to study varieties. We must get away from this old dingy colored fruit, stick to the high colored varieties of fruit, and there will be no question but that in the long run we will come out all right.

A Member—Would you encourage young boys like me, with very little knowledge, to plant a new orchard, or would encourage them to take better care of what they already have?

Mr. Rose—It depends upon what you have. I could not answer that question definitely, but so long as you are one of the boys, I think you could plan on growing a new orchard.

Well, I think perhaps this is all I have to say and as Mr. Welch is to follow, I will now give way to him, after which we will be glad to answer questions which you may desire to ask, as best we can.

The Chairman—Mr. Welch is on the program to lead in the discussion of this question, and he will now speak.

Mr. Welch—I listened with considerable interest to all that Mr. Rose has said, and I think that there are problems before us that are of a very serious nature. I am glad that the secretary didn't ask us to solve these problems. The people must do this themselves.

But the biggest problem that confronts us now, as I look at it, is the one pertaining to the marketing of our fruit. I rather take exceptions to what has been said in regard to a feeling of discouragement.

ment in regard to organization, from the fact that what might have been last year or ten years ago, or even yesterday, are matters of history. We have new conditions confronting us, and new ideas to work out, and we are better prepared to take up these matters now than we have ever been before. I do not think any one in this room would hesitate to say that the greatest problem before us is the one of marketing our fruit. I think that we should follow the best business methods,—the ones followed by other business organizations, in solving this question. The International Harvester Co., for instance, which is the consolidation of a number of like concerns, did not evolve all of its ideas from itself, but drew from all sources for its information, largely from its salesmen. They are on the ground, they know what they have to meet, and they know how to meet it, and these people have taken up with their suggestions and have found them to be the ones that are winners. So in making a market for ourselves, I am constrained to say that we have not followed these business methods as we should; we have lacked confidence in one another; we have been afraid that advantage was being taken of us, and have been unwilling to give our confidence to the work as we should. It is for this reason, I believe, that we have not had as good prices for the straight honestly put up fruit in proportion as we should have had. But it still remains a fact that there is altogether too much poor fruit packed. I asked Rose what effect of so much poor fruit being shipped had upon his business, whether under the system of marketing known as cooperation or through his own market, and he said it was considerable. He has had to meet and work out these questions himself. So has Mr. Friday, Mr. Hutchins, and others. These conditions do exist, and they are working against us.

The one thing for us to do is to talk up this matter, create a sentiment and put up a good pack. Convince the people of the fact that we have good fruit and they will be willing to pay for it, a thing they will not do under the present condition of things. I question whether it is possible for a man to establish a reputation of his own on what fruit he can handle alone with anything near the profit or benefit to be derived from such marketing, if the whole people were to help make a good market and cut out the unnecessary expense that we are up against continually as small individuals.

Then there is another proposition that we are up against,—we may be able to raise good fruit, but we are not all good salesmen. We are not all of us able with the means we have at hand, and the amount of fruit we have to ship, in an economical way, to meet these prices like people who have a larger amount. So I think today the greatest problem we have before us, the one that we should make the most note of, the one that would come home to each one of us, is the question of marketing our fruit better than we have ever done before. There are enough of them that do not come here that are careless in their methods so that we have got the reputation that really makes us Michigan fruit growers blush. Here is a man who comes to us (Mr. Phillips) who says that we are packing junk. He is not the first one who has said that, for we have heard it for years and years. We have resolved to do different, and I think that many are honestly trying to do different.

in fact, I think there is so much of this done as we might be glad to believe from the charges made against us. We have a reputation for committing a good many offenses of which I honestly believe we are not guilty. Perhaps you recall some time ago there was quite a howl went up in the newspapers because of some poorly packed peaches that went onto the market in a certain shipment, but of the thousands of baskets of good fruit that were shipped, nothing was heard of. What we want to do is to pack our fruit better and then use the best up-to-date methods of getting it onto the market and the least possible expense, and we will then be all right.

DISCUSSION.

A Member—I would like to ask Mr. Rose what he is using for a spray.

Mr. Rose—For scale, lime-sulphur. You will russet some apples with this solution, but it is the best there is. I think pears can be kept in better condition with Bordeaux.

A Member—One speaker spoke of growing peaches on clay loam with underlying clay sub-soil. Is it possible to raise a successful peach orchard on sandy soil that does not have a clay sub-soil?

Mr. Rose—My clay sub-soil is 75 feet under surface, nevertheless my peach orchard has been a success. I would not care for clay sub-soil if I had a good beech and maple soil. The clay soil is not adapted to some varieties of fruit.

A Member—Do you pull out trees affected with the Yellows and Little Peach and plant other peaches in their place?

Mr. Rose—I have never had any particular experience in this, but I expect to do it this next season.

A Member—What distance apart would you thin apples?

Mr. Rose—Six inches.

A Member—What distance apart would you thin peaches?

Mr. Rose—That is owing to your variety, all the way from six to eight inches.

A Member—How early do you commence to thin apples and how long do you keep it up?

Mr. Rose—I would advise you to consult your apple growers, but I think that as soon as you find that the crop is established to begin, that is, as soon as you have the men to do it.

A Member—How long would you keep it up?

Mr. Rose—Until the apple is as large as a walnut.

A Member—I have in mind a location that looks to me to be desirable in every particular, on a shipping point, but we are handicapped for want of help. We are not close to town, or anywhere where we can get sufficient help. I would like to ask if that would constitute a sufficient obstacle to keep a man out of the business, or can that be successfully solved?

Mr. Rose—I think it can be. We bring in our help and we run a boarding house. We furnish tents and we put growers in these tents and where they need it, we furnish gasoline stoves and a grocer comes with his wagon and furnishes them with whatever they want. The tenters are made responsible for their own bill, not us. Of course it

would make a difference how large an area was covered by your orchard and how much help was required. Not very long ago a fellow wanted to put in 160 acres of Montmorency cherries. He had not thought of the help question. He was away from where he could easily secure it, and I said to him, "Do you know where you can get 1,000 men, women and children at one time to pick these cherries?" He had not thought of that and he said no. Then I suggested to him that the area be made smaller. Now right here I would like to ask if you think it is right to be telling to people what wonderful things we are doing so that people with a little money, widow women and others, furnish money to invest in lands by the land boomers, when many of these practical problems have never occurred to them and they find out only too late after their money is gone that they have made a mistake.

A member—Do you spray your orchard the first and second year?

Mr. Rose—We spray our trees before we put them in the ground and then spray them afterwards.

A member—I think that one phase of this market problem has been overlooked, and that is, the greed of the men who stand between the grower and the eater of the fruit. A friend of mine went to a grocery in Chicago on the 10th of September and saw a basket of pretty good Maiden Blush apples. He asked the price, and was told \$.75 a peck. Then he went down to the South Water St. market, and there he saw practically the same apples, same grade, and was told that the price was \$1.25 per bushel. You see that retailer was standing between the wholesaler and the eater of the fruit, to the tune of \$1.75 a bushel.

The Chairman—I desire you to take particular notice of your new president, Mr. Munson. He will now take the chair for the remainder of the sessions.

Mr. Munson—I thank you, Mr. Farrand. (Applause.)

The Chairman—I am requested here to announce the award for the judging and identification of fruit. The first prize goes to Mr. Robert Loree; second, to F. C. Crawford; third, to S. C. Olney; fourth, to Mr. Belaire.

FACTS LEARNED IN THREE YEARS ORCHARD RENTING.

W. S. PULLEN, HILLSDALE.

Four years ago when we began renting orchards we knew of no one who was making a specialty of this work. We soon learned of a few others, one of whom was our president, Mr. T. A. Farrand. In the section we chose, Hillsdale county, for a goodly number of fair-sized orchards making little or no returns to the owner, and in some instances very lightly valued by them. In fact the second man I went to see about renting his orchard was plowing a stoney field and was not enough interested to stop on a corner and talk with me, so the deal was made while he turned a furrow and occasionally broke the Third Commandment as the plow handle hit him in the ribs, or he thought of the uselessness of the orchard on which I was endeavoring to keep his attention.

Of course, I was enthusiastic and possibly in my ignorance I was thinking how foolish of him to work so hard while this fine orchard on which apples and dollars would grow, with (in my estimation) so little effort.

We sometimes call these "pipe dreams" when others are affected the same way.

Well, I got the orchard on my own terms; secured a light crop the first year and insisted on more pruning the second year than he was willing to do, so we changed the arrangement whereby I paid him cash rent, took all the responsibility of trimming and full care of the orchard, having all the fruit.

We trimmed quite thoroughly, our work being approved by the field men of the college, so it was done near enough right for experience to endorse. This second year we secured a full crop, got good prices and the owner was sick of his deal and inclined to explode occasionally because of our success.

As is often the case, success made us anxious to get into the business on a larger scale, so we secured more orchards and interested several apparently reliable men in a way that looked reasonable to prove profitable to both parties. Last year these men were successful in securing a very creditable crop, but we did not get on the market just right and the profits were not on the right side of the ledger to make it look good to them. The consequence was, they flunked and left the whole contract for trees on our hands for this year, so we have had about 4,000 trees over a territory that you can scarcely cover in a day's drive, with an automobile.

However, we have handled it this year with even less expense than when the others were interested. Have done some trimming in every orchard, have sprayed so that the fruit is as good as the average sprayed fruit (which is below the standard we aim at) and yesterday we finished picking. In one section the orchards were hit by hail early in the season, injuring the fruit to such an extent that none of it could be barreled. We have a large number of Greening trees, but because of the winter, these and some of the Baldwins had very few, and in some cases, no apples.

We have harvested about 3,500 barrels, 1,000 boxes of good fruit, six cars of bulk stock and perhaps five cars of cider apples. Now, what have we learned?

First, the terms of contract must give the renter absolute control of the orchard for a term of years that will warrant expenditures, trimming and spraying for scale, as few owners are willing to expend sufficient amount of money for trimming to bring about satisfactory results.

Second, that the average farm orchard has too many varieties, part of which at least are of little value for market, even when they produce a crop. We believe rent should be paid only on standard varieties, but that the renter should have all apples except what is needed for family use for the spraying and care of odd varieties.

Third, the distance from a market or from the loading station is a big factor in the fall of the year. Teams are always expensive and sometimes very difficult to obtain at any price. Consider this well in rent in an orchard.

Fourth, it requires a lot of men to handle a crop of apples in the allotted time. They cannot be found where they can live at home and work in orchards so scattered as desirable orchards are likely to be. To board and provide sleeping quarters, easily moved, is no small task.

Fifth, it requires about as many hands to properly pack as it does to pick a crop. Boarding and providing sleeping quarters for this part of the help can be avoided only by packing the fruit at a central point, preferably the shipping station. So we have arranged a packing house. All the fruit is put in barrels or crates, lightly headed and repacked uniformly at this one place.

Sixth, apples from different orchards, even with identically the same treatment, will vary greatly and a uniform pack is almost impossible, except in this way; for instance, spies from an old orchard that has been dehorned, has a tendency to be light-colored, over-grown and poor keeping qualities even where all other conditions seem favorable. From a younger orchard and some times from an old orchard that has not been trimmed, medium size, high colored and good keeping fruit is often obtained. The cultivation or use of fertilizer may have a light effect.

Seventh, the owner of the farm could give the orchard the same care, get the same results and gather the fruit for much less than is possible for the renter to do. Especially after getting a good crop, we are made to feel that we have no right outside of those we have in writing, except in the orchard, and if we secure feed for a team or meals for a man and pay the full value for the same, we are still made to feel under deep obligations.

Eighth, storms, winter freezing or conditions over which the renter has no control, will occasionally ruin a crop. In this case the renter, having sprayed and cared for the orchard, should not also lose the rental money, but if he is willing to let the owner have what fruit there is, this should pay the rent for the year.

Ninth, better a good bunch of eight or ten hundred trees of one or two varieties rightly located, than to have more trees, badly scattered, with a worry and sleepless nights, especially when the wind blows or the mercury goes to settling down.

Tenth, I have stated that the owner can raise the fruit cheaper than the renter. The renter can only hope to offset the difference in cost by making better sales. Can he do so? The price in our section this season has been one dollar and seventy-five to two dollars on board cars, the buyer overseeing the packing. One renter of orchards has about 1,000 trees, made an exceptional sale, getting \$2.50 per barrel and 27½ cents per hundred for cider apples. The purchaser did not pack this fruit close and still this man was pleased to have cleared up \$50 per month for his year's work. With the wages commanded by a good laboring man in almost any line, this will hardly appeal to most of us as being an exceptionally desirable proposition.

Yes, we have learned something about the various diseases, scale, fungus, spraying material, pumps and gas engines, thinning, trimming, cultivating, cold storage, re-packing, borrowing money and just a little about marketing, but what we want to know is how to get 60 cents per peck for common stock, as they are now doing with the cheaper

grades of apples sent to the cities, then perhaps we can tell you how to rent orchards and realize the ideals we had when we were more enthusiastic than we are today. But the fever will be on again as soon as we are a little rested from harvesting the crop. The possibilities are great, the opportunity is greater and the orchards in the grain-growing sections of Michigan will be saved only by men who make a specialty of orchard work.

Not out of place to mention the fact that better roads would greatly reduce our expenses both to haul the fruit and moving.

Compulsory spraying would be a protection from uncared for orchards.

DISCUSSION.

Mr. Farrand—I think that Mr. Pullen has done very well indeed. (Applause.)

Some one has said that a little knowledge is a dangerous thing. I should like to shake hands with the author of that statement, for he is right. That is what I have learned. One of the things I have learned is that when a man owns an orchard he could, if he would, work that orchard at half the expense that I can do it, and while that might be a loss to me, it would mean a profit to him.

Another thing I have learned is that while we try to profit by the experience we have had this year by preparing to meet the same contingency next year, that contingency doesn't happen, but something else does happen. It don't make any difference how long we have been in the business, in spite of our experience, something always happens to bump. While prices were good the first two or three years of our business, the last two years they have been low and poor.

Then, I have learned a lot about human nature. What I have had to contend with in the orchard renting business in five years has given me an experience that I would not learn in twenty-five years handling the crop of my own orchard.

The help problem is perhaps as great as any of the problems we have to contend with. It is a large amount of experience that one gets along these lines that you never meet at your back door. Then, you have everything to do with. But in the renting proposition the one great problem is how to get things done against obstacles. Obstacles will arise that you never thought of, never even dreamed of, and you must meet them when they come—you can't prepare for them ahead of time. You may prepare for them ahead of time and then they won't happen. I have learned that what happens in one year in all probability will not happen next, and yet it may. That what will be profitable one year will not prove profitable the next in the handling of our crop or in different lines. In getting all things done as they should be one often has to think quickly.

When you are away from home, the sleeping problem, the barrel-ing problem, and all these things, the team work especially and then the men in different orchards, working at the same time—why you can't be with them all, especially when you branch out considerably—these are all problems that we have to deal with and they are oftentimes more perplexing and harder to solve than you might imagine. There are so few people who will really work for your interests, but we have

found (a brother is in with me) that when we are not on the job personally to control their movements it is difficult to get anything like satisfaction from the ordinary help that we are obliged to employ. It would hardly seem as though it would be this way but we have found it so.

Then, there is another side to this question, and perhaps it may be where some have made failures, where otherwise they might not have been. There are two sides to the proposition that interest me, one, the commercial side, and the other, the ethical side. When I see an orchard that has not done anything because of a lack of care, that orchard appeals to me to make it do something. It may cost me all that I make out of it, but I never hesitate at the expense to make it come up to its best and reach a standard that I try to have it attain, and I have the satisfaction of knowing in a goodly number of cases that I have done something for an orchard, have demonstrated that the application of the methods we have advocated for years, are all right, even though it has not proved a profitable investment from the commercial standpoint. I have in mind particularly an orchard that we have had for two years. It is a large orchard, and today it is one of the finest orchards in the state of Michigan. When we got it it was in a very poor condition. A lot of things I didn't know then, but that I supposed I knew, I have learned since. This is a Northern Spy orchard. I found it to be 33 years old, and we invested quite a large sum of money in it. We find it takes a lot of money in the orchard renting business. You must spend money if you get any money back. We never picked an apple the first year, from this orchard. I suppose that orchard has borne three or four crops in the 33 years, and that is all.

Then there is another thing that we have learned, and that is that you want to have every thing put in writing so that it is known just what will be expected of each party, and then there will be no quibbling or getting around what is plainly the duty of the owner of the orchard, after he finds out that his orchard is made to bear better than he supposed it would.

Then we have found that it is well to have only a few varieties. Too many varieties are not good. By having two or three varieties instead of one in an orchard, and that gives you more time for harvesting.

A Member—With good apples selling at \$2.00 per barrel, what encouragement have we to go on setting new orchards?

Mr. Farrand—The man who owns his farm can make a good profit at \$2.00 a barrel, if he gets a usual crop. On the other hand, if you take an orchard, raise it, prune it, and for twenty years pay the price for labor—if I thought I had to sell my apples for less than \$2.00 per barrel, I think I would look for something else to do.

A Member—Now this seems to bring us back again to the question of marketing our fruit. If we never have any more satisfactory means or better ways of disposing of our fruit it seems to me that we would hesitate about planting new orchards; but as was said, we must educate the dishonest packers to act right, but to truly educate a man you should start at the grandfather. The education will not be so very effective if you start in to educate now; that is, it will not have a very decided effect on the people you try to educate. I think that Mr. Smythe hit

it about right that these people who haven't the fear of the decalogue before them ought to be made to do the right thing by law. The gentleman from Canada says that over there it is unlawful for a man to market an apple that is wormy. What would happen if we had such a law here? There certainly would be a very different state of things than now exists.

Mr. Parker—I think that in this proposition something is touched more than appears on the surface at first thought. The high cost of living is determining the cost of the production of apples. It is also determining the law of consumption of apples, and when the percentage of the cost of living is 20% higher than the increase of the wage laborers, they cannot consume the apples. Now then, if this organization can tell us how the fruit growers of the state of Michigan can go to work and form a corporation with a stock company by which it can put one dollar in stock to six dollars of water, and then demand dividends upon that six dollars of watered stock, that is equal to the legitimate profit on six dollars actually invested then you will have the actual condition as expressed in reports of Dun and Bradstreet on financiers at Wall Street. When you can get at the conditions by which you can demand as they do, and increase equal to the high cost of living, and proportionate to the amount that they now ask on their watered stock, then you will have the problem solved. There are two thousand million dollars of dividends taken out of us by these people who do not actually have one dollar invested. When you can form such a corporation and with such laws that for each dollar invested you can demand that our people pay an amount that will bring the dividend on six dollars of watered stock, equal to what it would be if it was really invested stock, you can solve the question.

A Voice—What happens when the bubble bursts?

Mr. Parker. I would say it would be a case of glass apples. There are thousands of people going without apples for this very reason, but the thing that we want to do as a people is to go out of this bubble business.

The fact is, the middlemen that handle our fruit are the ones that are in control of that bubble to a large extent. I do not want to seem to be out of place nor to take this question into politics, but I would like to tell you of an incident in my life when the Homestead strike was on. I poured bushel after bushel of corn into the stove. There were three cars of coal loaded that was held up by the Homestead people until after the strike was declared off. They went to the Supreme Court to get these cars moved, but they did not succeed. It aroused my thought, to think that I should pour that corn into that stove in the place of coal, while they were starving to death for want of food. I tried to unravel the matter, and I found the same men owned the railroad that hauled the coal, also sat in the Senate, so until we can reach that Senate, we can never burst the bubble.

A Member—Should winter apples be put on racks, or shelves, or barrels, head up to keep best?

Mr. Wiles—I do not know as I have any more information on this subject than anybody else here, but before answering it I would like to say just a word—I don't see the need of planting apple orchards—

I might be misunderstood from what I said, and some might get the idea that I was getting cold feet on apples, but that is not so. The right man in the right place is all right yet.

About the keeping of apples, we have cold storage. We can keep them in open crates, or anyway, without fear of shrinkage, because the ice keeps the room pretty damp. We spray the room with copper sulphate to keep the mold down. When you store them in chemical storage, you must have tight packages. The Baldwins and Greenings will be wilted if stored in open crates. This letting air to fruit may be all right for keeping purposes, but it will not be right when you consider the salability of the apples. My idea is to keep the apples in a fresh condition, and to do so, it should be kept in ice storage, as we have, where it is damp—keep in closed packages, and cool enough to keep from molding or spoiling.

A Member—Is it necessary to have a cold storage? Would not a dry frost-proof room be fit?

Mr. Wilde—That would depend on the amount of money that you put in and where you were located. If it is away from the large towns, it would not pay to put the necessary expense necessary for an ice storage, when you can make a common cold air storage so much cheaper, which would accomplish the same results, especially if you were further north. Many people up there keep their apples to the very best advantage. My storage cost me \$6,000 at first and then \$500 now and then for repairs. It is like an ice house, it rots. It is hard work to keep it from rotting. I close the door during the day time and open at night. If your apples are free from scab and worms you can keep them the winter through, but if they have scab you can not keep them at all after the spring. You must have the right stock, and then there will be no trouble about the keeping qualities. Here in Grand Rapids a couple of weeks ago apples were brought out of the cold storage which have kept all winter in my place and all summer in a neighbors, but they were perfectly free from scab.

A Member—What do you think of storing apples in a basement in bushel baskets? We have done this to some extent and put the baskets four tiers high. We don't put any covers on top but cover them with paper and then we have a board over the top of the baskets. And then we have a good degree of air circulating in the basement. We have nothing but apples in that basement. Just how long we could store these apples, and have them keep in good shape, I could not say. If they were put in without being bruised, and in perfectly good shape, I think they could be kept for a long time.

Mr. Wilde. That is not a hard proposition. I would say by all means get smooth crates with narrow cracks and use them preferably to anything else. These you can pile reasonably high as you cannot do with baskets.

METHODS AND BENEFITS OF OUR COOPERATIVE ASSOCIATION.

ROBERT THOMPSON, ST. CATHERINES, ONTARIO.

Mr. President, Ladies and Gentlemen: I heard a story recently of a man who died and presented himself at the pearly gates, was admitted, and when he got there he was being shown through the different departments in order to choose one for himself. Finally he came into one where there were a lot of chaps—they were not burning. Then he asked who they were, and was told that they were a lot of fruit growers that were too green to burn; they voted against reciprocity, and were hung up to dry.

Well, I don't happen to be one of those chaps, for I voted for reciprocity. The benefits that it has been to our growers throughout the district, and indirectly to the growers throughout the province, are the same as they have been to our individual members.

But after all, it all depends upon the men themselves that form the association, and the men chosen as directors. No manager, no matter who he is, will be able to handle an association unless it has good directors and good stockholders behind it. If they are not loyal and do not do what is fair, his energy and ambition or whatever he may have, or inducement or salary, will soon lag, if they are not loyal.

The benefits that we have received have been more marked indirectly than directly. No one knows this more than the directors, and those who have been in close touch with us.

Our association was possibly the first, although we are a joint stock company, at the time it was formed sixteen years ago, we had no law to allow us to become incorporated, but we are now running under a cooperative system pure and simple.

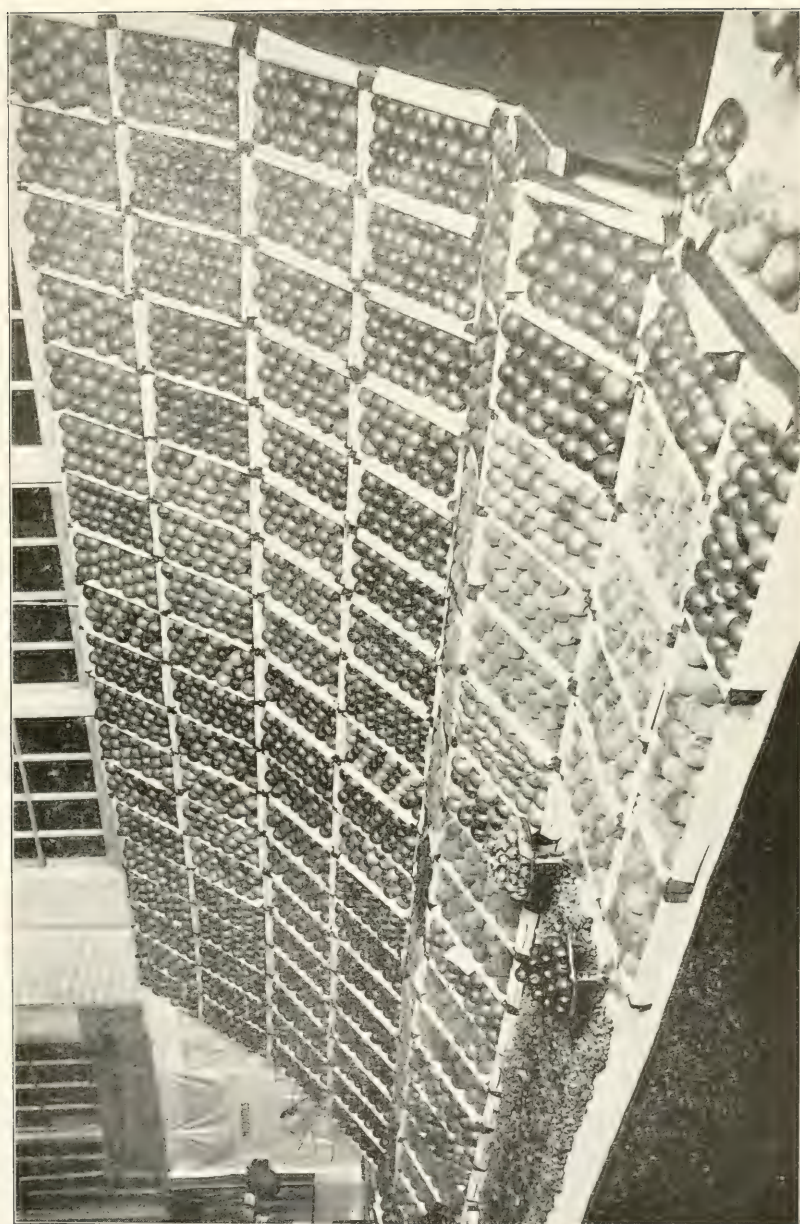
We have a central station for the province—corresponding to your state. It is not yielding the benefit that it should for the reason that there is only a few of the better associations that are willing to go in heart and soul on a business basis to support it. For instance, we have a lot of associations willing to take advantage of the Central station, getting the lowest prices for supplies, willing to send in their orders on that basis, and willing to wait and keep the central waiting for months until they pay for their supplies. The same thing is true in our local. These different associations throughout the province are framed in a different way. Some have capital paid up, and having paid up that will be there for years to come. As a rule, where fruit growing is on a solid basis that is the better way—but in some cases if the majority should not pay up very well, and thereby friction, and buyers from the outside come in and pay more money for fruit than the association can get, and in this way seek to injure the association, the members have become discouraged and felt to throw the whole business up. But when another season came around the results have been that the plan was revised and started on a fair footing again—sometimes

better than before—because of the property there, which they felt they could not afford to let go. But where an association has no basis except the organization with a dollar fee, when little troubles arise they say they will not put their money there and refuse to do anything. However, they are not all this way and a few of the fruit growers are long suffering enough to put up with this kind of talk, the directors stay by their guns and the outcome of it is in most cases that these same ones will come back and in the end the results will be more satisfactory because of the organization. But just the same, where they have something tangible behind them, there has been more success than otherwise. It has been quite noticeable over there than in the counties in which the best associations are formed, the property has gone up. The largest number of our associations are apple growing associations, and are controlled by apple growing men, and all of the better ones have no trouble whatever in selling their apples and getting good prices for them. The effect of all this has been that the indifferent ones at first have noted the results and they have fallen in line not only to do better spraying, but give better care to their orchards generally and the standard is gradually rising so that on the whole we think the time is not far distant when every one that raises any fruit at all will be enlisted on the side of the improvement.

Then another reason why a better grade of apples has been put up of late is that we have inspectors and packers who see to it that a better grade of fruit is packed. Much has been said about junk pack—a good deal has been said about this by the retailers and in many instances the retailers themselves are to blame for this. This is particularly so in regard to grapes, but what we are seeking for is to raise the standard all along the line and uphold it and in this way establish a reputation for a good pack of superior fruit, which will bring us repeat orders from year to year. We feel very much encouraged in what has already been done, for we have been able to hold the price and secure to our growers one cent per basket more throughout all the northwestern district where we have been shipping our fruit, and we have been able to get it without any trouble.

In this connection, I desire to say that we must not become discouraged because after you have formed an association your neighbor desires to come in and be benefitted by it, even though he does not join the association. Don't bar him out. Be magnanimous. Let him receive all the benefits that the cooperation will afford, for he cannot long partake of these benefits and not be encouraged to unite his efforts with those of his fellows and in time will surely become a good working member, and when he begins to show a spirit of improvement, you will find it will be catching and that will help to raise the standard and so all will be benefitted proportionately.

Then when it came time for us to purchase our supplies a few of us in the beginning thought it would be advantageous to buy in large quantities, and this we did, and it was decided that we would not draw the lines on regular members of the association, but we would supply any one who wanted to come in, whether a member of the association or not, for the more we bought, the cheaper we would get it, and the more advantage that came to those who bought, the more friendly it would make them towards cooperative effort, and that is what we



Sweepstakes fruit display at Grand Rapids Fair, 1912, which won the power sprayer for Friday Brothers of Coloma, Michigan.

were striving for. In doing this, we have been able to keep the price down to the lowest point to all the growers.

We have prices that we do not give out, that we do not even tell our growers, and that is one thing where the grower gains by going into the association. Those who join the association should have confidence in the directors and the association should have such directors as the members can have confidence in, and then do not hesitate to stand by them to the fullest extent.

We have been able, as I said before, to get the very best goods in this way, and at the lowest market price. We have a good man who has passed through Cornell, and is considered excellent authority on fertilizers. In this way, we are able to have his help, which we consider very fortunate. Then we have some other men who are expert in other lines, and they too, help us in the same way.

Now, as to markets, to supply. Well, ask the fellows who have been there. Do you want to plant for the factory, or for local market, or for long distance shipping? Of course, the more lines that we grow, the better it is, for then all the eggs will not be in one basket. Then, by having these large supplies of various fruits we would be able to get a through rate of 66 cents to the northwest, whereas at the present time we have to pay a rate of \$2.65 a hundred if we send by express.

DISCUSSION.

Mr. Hale—I don't want to say a word against anything that sounds like opposition to the city of Grand Rapids, for if I did, I don't know as it would be safe for me to go out after dark, but I would like to say to you on the P. Q. that I don't think they have yet seen the full need of an association here. I have had experience along the same line of this gentleman, and we have done very well not because I managed it, but for other reasons. And so I am in favor of cooperation, and doing everything we can to promote a friendly interest and a lively spirit in the work.

Mr. Bentall—Mr. President: I had no expectation of saying a word here when I came—I came simply to learn. But I do want to demur from what I have heard different members say that there seems to be a suspicion abroad that it is impossible to combine the farmers. Now I think it is possible to combine farmers. They are alive to their interests, if they know what their interests are. Three years ago we formed a society in order to learn a little about our business. After a time we thought it would be all right to buy our spraying materials in car load lots. Then we thought to buy our packages that way, and our barrels by the thousand. That worked all right, and this last year, we thought we would ship together, and we did so, sending out eleven carloads, and on the whole, we were as successful as the men who shipped to the Chicago market. Now this has developed quite a large correspondence, and this year we have had more inquiries than we could satisfy. We have shipped 22 or 23 cars of fruit and we have not had a quarrel—not that we have not some times looked at things differently but nothing so serious but what it could be adjusted all right. We have acquired a warehouse property, and our own side track and we have been able to cover the expense of shipping for 5 cents per barrel,

and members are packing their own fruit, and we have had only a very few real complaints. Not 5% of the fruit has been complained of. We have been so successful with our fruit in the north part has won for us many favorable comments, and repeat orders. The correspondence that has come to us is of a very satisfactory character and already we have had a good many inquiries and requests for doing business with us another year. One man bought apples 600 miles away, and then he came back and bought 3 carloads, so friends, this idea of cooperation can be carried out, and with us I am confident that we will easily be able to handle all the output of our district this coming year, in the manner indicated.

While some are a little skeptical at the same time the majority of our members, and those directly interested in the work, are heart and soul in the enterprise, and have taken shares of stock in the association. The packing has come up from 10c to 20c. I do not feel that the farmers are a bit more to blame for many of the troubles that are complained of, than the men who come out to buy. I could go into details on this matter, but I will not.

There are many places throughout the country where they will pay more than the Chicago market will give at the same time. The first four carloads of Dutchess that we sent out were settled for in such a way that it netted our growers \$1.85 per barrel at Northport.

A Member—Does each member pack his own fruit?

Mr. Thompson—In some cases they do, but these apples are inspected. Every barrel of apples packed in Canada must conform to No. 1 or No. 2. Growers are liable to inspection from the day the fruit is put on the market until it reaches the consumer.

A member—What do you pay your help?

Mr. Thompson—12½ to 15 cents per hour to the girls.

A Member—Do you personally value your Canadian fruit market law?

Mr. Thompson—We certainly do. Indeed, the law that we had had been asked for by the fruit growers. The government in any country will do almost anything that incorporated bodies ask them to do. They will pretty nearly appoint the men who are satisfactory to the association. We have a new set of inspectors, but so far as I know, they do just as good work as the men who were there before. In every case, we look on these men as our friends. Take for instance, in the northwest, where we are sending our boxes, where the western fruit has been forced upon the people and these people have really looked right after the fruit growers interest. They will not stand for snide stuff. The result of it is that it has put our apple business on a better footing than it was ever before. At first, we had only No. 1. These were defined to correspond with your standard grade. We did not put the size on. Five years ago we defined No. 2, a smaller size, a little off in color, but free from any blemish that could in any way cause waste or decay.

It is a question in my mind whether you are ready for cooperation here. Cooperation does not take very readily until you are up against it good and hard. When you are, then you can get men to come in. When you are doing pretty well, it is hard to get men to come in, but

when adversity comes, or there is something that causes them to lose their crops, then they are willing to do anything that promises to retrieve their losses.

Mr. Hutchins—To what extent is the success of your Canadian law due to the work of the inspectors? There seems to be a difference between your law and our Sulzer law—there you have inspectors, and it has occurred to me that this Sulzer law may be disappointing to us in its outcome because we have no system of inspecting like you have.

Mr. Thompson—That has been changed from term to term. When we first passed the law, we had but few inspectors. The fruit growers asked for more, and they have been increased from time to time. We had a fruit conference and there is talk now of a still further change in the law.

We now have one for every county. Of course, he has nothing to do for four or five months of the year, but these go wherever they are growing apples, and you do not know when they may appear. These inspectors are often very kindly disposed to the growers and frequently are very helpful to them in the way of suggestions concerning packing, etc.

A Member—We have no inspection under our law. I would like to know whether your law would have been a success if you had had no inspectors.

Mr. Thompson—No, sir, I do not think so.

Mr. Smythe—Your law in Canada compels all regardless of who he may be, to put his name on all closed packages—a barrel. Is that not so?

Mr. Thompson—Yes, in a way, but a crate of berries is not counted as a closed package with us. The law does say that all the shippers in Ontario shall put their names on the packages, but this is not in force, although I think it should be. I think it would make a difference whether a man's name was on his package or not.

A Member—How do you conduct the financial end of your supply purchasing?

Mr. Thompson—For our fertilizers, the system we have is this. We go to the different members and find out what they need. Perhaps one will say, "I want \$300 worth" then we say, "Give us a note for \$300 due the 1st of October." These notes are endorsed by good people and they are bankable and we can get all the money we want on them.

Question—Do you pool your sales on grapes?

Answer—Yes, they are pooled each week.

SOIL ANALYSIS FROM A CHEMIST'S STANDPOINT.

PROF. A. J. PATTEN, AGRICULTURAL COLLEGE.

Mr. President, Ladies and Gentlemen—The subject which has been assigned to me at this meeting I have tried to treat in a popular way, and if you will pardon me, I will read what I have, because I fear if I trust to my memory, I omit saying some thing that I very much want to say. There is so much to be said on this subject, that I do not want to miss saying some of the things that I particularly wish to say at this time.

There exists today two distinct views of the soil. The one considers the soil simply as a place in which plants may grow and from which they receive their food. In this view of the soil the supply of plant-food, available for plant use is considered as fixed for any given soil and that its productive capacity is entirely governed, under good farm practice, by the amount of plant-food contained in the first few inches of the surface soil and the demands made upon this supply by the crops grown. Infertility has generally been attributed to an actual deficiency of plant-food in the soil or a lack of available plant food. In this discussion, it should be remembered that by plant-food is meant nitrogen, phosphoric acid and potash.

It may be said that this view of the soil originated with the famous German scientist, Liebig, popularly known as the "Father of Agricultural Chemistry." About the middle of the 19th century Liebig presented to the world his views as set forth in the following four laws:

First. "A soil can be termed fertile only when it contains all the materials requisite for the nutrition of plants, in the required quantity, and in the requisite form."

Second. "With every crop a portion of these ingredients is removed. A part of this portion is again added from the inexhaustible store of the atmosphere; another part, however, is lost forever if not replaced by man."

Third. "The fertility of the soil remains unchanged, if all the ingredients of a crop are given back to the land. Such a restitution is effected by manures."

Fourth. "The manure produced in the course of husbandry is not sufficient to maintain permanently the fertility of a farm; it lacks the constituents which are annually exported in the shape of grain, hay, milk and live stock."

The promulgation of these views had a great influence upon the agricultural practice of the time which has extended even down to the present and placed an added emphasis on the value of the mineral plant-food constituents. It was believed that with the results of a chemical analysis of a soil it would be possible to determine its crop-producing power and likewise its fertilizer requirements. This as you will readily see, makes the question of soil fertility a simple problem in mathematics. Knowing the percentage of plant-food constituents in any given soil, it is only necessary to apply the multiplication table to find out the

total amount of plant-food contained in one acre, to any given depth. Likewise, knowing the amount of plant-food removed by the crops grown, also revealed by chemical analysis, the multiplication table will tell us how many years our soil should be able to support a crop and also what amounts of plant-food should be returned to the soil each year that the fertility may be indefinitely maintained. Could anything be more simple? As you will readily perceive this view of the soil makes the amount of the mineral plant food element (nitrogen, phosphoric acid and potash) the index of fertility and they have very naturally been considered by many as the very foundation stones upon which successful agricultural practice rests. No doubt every one of you have heard these three plant-food elements, many times, extolled as the tripod of agriculture. Consequently the scheme of practically all investigations, until comparatively recently, has been with a view to ascertaining the amounts of these elements in the soil and the amounts removed by crops.

With this view of soils it becomes quite imperative that we have some standard by which a soil may be judged as good, bad or indifferent. Many persons have attempted to establish such a standard, but strange to say, the various standards fail to agree. The one most generally referred to is that proposed by a German chemist.

Grade of soil	Potash	Phosphoric acid	Lime		Total N
			Clay soil	Sandy soil	
Poor.....	Below 0.05	Below 0.05	Below 0.10	Below 0.05	Below 0.05
Medium.....	0.05-0.15	0.05-0.10	0.10-0.25	0.05-0.15	0.05-0.10
Normal.....	0.15-0.25	0.10-0.25	0.25-0.50	0.15-0.20	0.10-0.15
Good.....	0.25-0.40	0.15-0.25	0.50-1.00	0.20-0.30	0.15-0.25
Rich.....	Above 0.40	Above 0.25	Above 1.00	Above 0.30	Above 0.25

The only serious objection to such a standard is that the facts, as revealed by actual experience do not, in a great many cases, conform with these figures. It is also very evident that the man who proposed this standard failed to recognize the fact that some crops are especially adapted to certain kinds of soil, and that they will do far better upon the particular kind of soil fitted to their needs, by nature, regardless of its plant-food content, than upon any other kind of soil.

According to this classification the great majority of the agricultural soils of Michigan would be classified as good or rich, although we know from actual experience that many of them are not up to, what we may call, their normal productive capacity.

The following table gives the analyses of a few soil samples that have been made in our laboratory during the past few weeks.

Soil No.	Insoluble matter	Potash	Phosphoric acid	Lime	Nitrogen
1	96.33	0.05	0.03	0.14	0.069
2	96.26	0.06	0.06	0.10	0.043
3	96.94	0.03	0.05	0.07	0.036
4	97.42	0.04	0.04	0.07	0.027
5	95.66	0.06	0.13	0.66	0.090
6	95.90	0.05	0.05	0.15	0.091
7	94.71	0.03	0.05	0.43	0.128
8	88.18	0.22	0.18	0.84	0.271
9	94.00	0.038	0.79	0.079
10	94.16	0.032	0.82	0.087

Soils No. 1 and 2 are from newly cleared land in Manistee county. The soil represented by No. 1 was set to peach trees last spring and No. 2 was set, during the spring of 1911, to apples, pears, peaches and cherries. According to the classification previously given, both these soils would be ranked as poor but it would be difficult to find a better or more thrifty looking lot of trees than these were last July. How long they will continue in their present condition without fertilization, is impossible to say but I predict that with good cultivation and cover crops they will continue to make good growth for many years to come. Soils Nos. 3 and 4 also come from Manistee county and represent the so-called Jack Pine sand region. Soil No. 3 was taken in a young orchard set in 1911, which has had a crop each of rye, clover and vetch turned under. While this orchard is not as favorably located as the two just referred to, yet the trees have made good growth and were looking thrifty. Soil No. 4 was taken in a corn field across the road from this orchard and nothing had been done to it further than plowing and fitting for the corn crop. It is needless for me to say that the corn crop was looking very poor and weak. A good illustration of the unadaptability of crop to soil. Soils No. 5, 6 and 7 are from Benzie county. Number 5 was taken in an orchard, which is about 20 years old. This orchard has been well taken care of and has received frequent applications of manure and commercial fertilizers in addition to having cover crops turned under. Number 6 was taken in a pasture adjoining this orchard and so far as is known has never received any manure or fertilizers. Number 7 was taken from the roadside opposite this orchard. The only marked difference in these three soils is found in the amount of phosphoric acid and lime contained in them. This may be accounted for in part at least by the addition of manure and commercial fertilizers; but if we assume that this orchard soil originally contained the same amount of phosphoric acid as the pasture soil then the difference between them now is greater than the amount present in the soil before the orchard was planted. This difference is equivalent to 10,000 pounds of acid phosphate per acre 7 inches, or to an annual application of 500 pounds of acid phosphate over a period of 20 years. Such an amount of phosphoric acid has in all probabilities not been added to this soil. It is more plausible that in taking the sample some recently applied fertilizer, which had not been thoroughly incorporated with the soil, was accidentally included or else the natural and unavoidable error of analysis is, in this case, more pronounced than in the other cases. It may

also be true that in this case phosphoric acid is being brought up from much lower depths by the capillary water faster than it is being used and is therefore, increasing in the surface soil. However, the point I wish to make in this connection is this: This orchard set 20 years ago on soil that would classify as poor from the plant-food standpoint, is today, one of the finest looking orchards in the whole state and I know of no one who would presume to say or even venture the opinion that had the same trees been planted in a soil with twice the amount of plant-food as was contained in this soil No. 5 they would have produced any more fruit. Sample No. 8 is from a farm in Kalamazoo county. It is of a very different character than the soils previously considered, being a clay loam, and it contains a considerably larger amount of plant-food. The productiveness of this soil has been increased, by the present owner by practicing good methods of farm management and not by increasing the amount of plant-food.

I desire to call your attention particularly to samples 9 and 10, which were taken from adjacent farms in Barry county. These soils would be classified as sand but number 9 was producing in the neighborhood of 30 bushels of wheat per acre while number 10 was producing less than 10 bushels per acre. In seeking for an explanation for this difference it is very apparent that it is not due to a difference in the amounts of nitrogen and phosphoric acid and in all probabilities there is no appreciable difference in the amounts of potash in the two soils.

I regret that I am unable to say what is the cause of the difference in productiveness in these two soils as we have only had time to make the analyses referred to. However, this one example serves to illustrate hundreds and thousands of similar conditions. I presume there is not a farmer within this sound of my voice that has not some places on his farm that fail to produce as abundant crops as the adjoining areas. Such cases cannot, certainly, be explained by any marked differences in the amounts of nitrogen, phosphoric acid and potash. We must seek further for an explanation of these differences.

While it has long been recognized that the organic matter of the soil has a great influence upon the productiveness of the soil it has been looked upon as influencing the physical condition of the soil rather more than the chemical. Though in more recent years the turning under of leguminous crops, as a source of nitrogen, has been receiving more and more attention. During the past few years, however, a critical study has been undertaken in a few laboratories of this country to find out more about the nature of the organic matter of the soils and its influence upon fertility. The result of this work, so far, has been that quite a large number of organic compounds have been isolated from soils and some of them have been found to have a decided injurious effect upon plants while there are others that have as decided beneficial effects. These compounds have resulted from the decomposition, in the soil, of organic matter turned under as green manure or introduced as barnyard manure.

It is not at all strange that these compounds should be found in the soil, but, on the other hand, it would be decidedly strange if we failed to find, at least some, of these compounds, for when these same materials (green manures) are allowed to decompose in the laboratory many of these same compounds are formed. The process of decomposition in

the soil cannot be very different from the decomposition in the laboratory for there is present in the soil the very agencies which affect the decomposition under laboratory conditions. I refer to the countless number of microscopic organisms: bacteria, molds, yeasts and fungi. You are all familiar with the work of these organisms on various materials above ground and I need only to call to your minds a few examples, as for instance, the souring of milk by bacteria, the destruction of grain by molds when stored in a warm, damp place, the transformation of sugar in apple juice into alcohol and vinegar by yeasts and the brown rot of grapes by fungi. Changes in the organic matter of the soil, of a like nature to these, are going on continually in the soil, when the temperature conditions are favorable, and the result must be the production of a great many compounds in the soil of which, as yet, we know very little.

Some of these compounds contain nitrogen and some contain phosphorus and a great many of the compounds already isolated contain neither one of the so-called plant food elements and I now come to the most interesting and perhaps most important phase of the subject.

It has usually been considered that nitrate is the best form of nitrogen for plants and that it could not be used by plants in any other form. Now we do not find nitrogen in plants in the form of nitrates (with the exception of a few cases) but on the contrary it is in the form of very complex protein compounds. It is very evident then, that if the plant gets all of its nitrogen as nitrate it must expend an enormous amount of energy in building up these complex compounds. Now, as has already been indicated, when these protein compounds are decomposed by bacteria or other agencies, they are split up into simpler but still complex compounds, which are again acted upon by the same or other agencies with the production of more simple compounds. This action may be carried on until a part of the nitrogen, originally present in the protein compounds has been changed into nitrate or ammonia. Now, since the plant must transform its food material into these very complex materials what is more plausible than that it may make use of some of these simpler decomposition products before they have been reduced to nitrate.

While I realize that this is decidedly contrary to the time honored theory that plants can only take their food material in the simplest forms but, why not change our views on this subject if the evidence is sufficient? We are now experiencing a similar change in regard to the theory of animal feeding. For a long time it has been supposed that a ration balanced with respect to protein, carbohydrates and fats had solved the problem of catle feeding, but recent researches have disclosed the fact that there is a great difference in the feeding value of the various protein compounds and indicate that in order to obtain the greatest efficiency we must take into consideration the decomposition products of the protein materials we feed. We must therefore, take into consideration the possibility of the plant making use of these soil decomposition products as plant-food just as they can use the more simple forms of nitrogen, phosphoric acid and potash.

It has in fact already been demonstrated that plants will use some of these soil decomposition products and even when it has access to the



Montmorency cherry orchard on E. J. Morgan farm in Leelanau county. Sixty acres in sour cherries.

usual forms of plant-food. Then again, some of the injurious compounds formed in the soil appear to be less injurious in the presence of nitrates, phosphates and potash; with some, nitrate gives the best results, with others phosphate and with still others potash has the most influence in overcoming the injurious effects. So it is seen, that the fertilizer have a value, when added to the soil, in addition to their plant-food value.

This new view of soils is well expressed in the following words of Dr. Schriener: "The soil cannot be considered as the dead, inert remains of rock and previous vegetation, but must be considered as an accumulation of such material in which the process of formation, alteration and transposition are still at work. In other words the soil in its entirety is not dead or inert, but endowed with functions analogous to those of life itself. In it take place the same processes of solution and deposition that have taken place in past ages, and are taking place today in the geologic processes connected with the action of the water on the rocks and minerals of the earth's crust. In it take place the same physical and chemical interactions as take place in the movement of subsurface waters generally, resulting in ore formations and depositions. In it take place the same processes of fermentation, digestion, or decay of organic materials as take place in animals and plants or in the production of industrial products, such as cheeses, wines and beers, brought about in the soil as in these other processes by means of ferments, bacteria and fungi or molds. In it take place the same processes of oxidation and reduction which play so important a part in all life processes and it has been shown that the nature of the compounds in the soil organic matter is the same as those derived from similar laboratory processes of digestion, oxidation or reduction. Organic matter is very changeable; it is the material which forms the food, as it were, of all the microorganisms of the soil, of the bacteria, of the molds, etc., and influences them favorably or unfavorably, just as the higher plants are affected. In turn these agents are great promoters of these changes in the organic debris of the soil. All of these processes and life forms in the soil are affected by fertilizer salts when added to the soil, and changes are produced in the soil, physical, chemical and biochemical, which influence the soil and affect its potential fertility irrespective of the added plant food."

So, the message which I bring to you today is one of optimism. I have no patience with the man who is continually preaching soil exhaustion and predicting the time when our soils will no longer support our increasing population. The soils of Europe and Asia, which have been under cultivation for centuries are still producing good crops and give no evidence of any decline so long as they are properly handled.

The maintenance of fertility, I admit, is still a big problem with us but it cannot be solved on the basis of supply and demand of plant-food. This has already been well demonstrated for if this were the solution it would have been solved long ago. But the problem is still before us. That it will be solved I confidently believe and I look for the time to come when it will be possible for the chemist with probably the assistance of the bacteriologist, the physicist and the plant physiologist, to examine a soil sample and determine the exact cause of infertility and prescribe the remedy. It is going to take time, however,

before this is accomplished for there remains yet a great deal to be learned.

It is not strange that the older scientists of the time of Liebig should have attacked the greatest importance to the mineral plant food for at that time; organic chemistry was little developed, the science of bacteriology was hardly known and plant physiology was in its infancy.

It is strange, however, that, with our present knowledge of these subjects, their influence in the solution of the problem should be so completely ignored by so many.

The chemical department of the Michigan Experiment Station is in full sympathy with the new view of soils and our soil work is being conducted along those lines.

The Chairman—We must hasten with our program for it is getting rather late. The next topic is "Clearing and Developing of Three Hundred Acres of Land for Fruit Growing," by Mr. J. E. Merritt, of Manistee.

Mr. Merritt—Mr. Chairman, Ladies and Gentlemen: I was quite surprised a few days ago to receive a letter from Secretary Bassett asking that I come down here and tell you something about my experience in clearing up a piece of land for fruit growing.

I replied to him that I feared that I might not be able to interest you, but inasmuch as I have had some slides made illustrating our work he asked that I come down and show them, and I have consented to do it. As I was coming down here on the Pere Marquette train you know I would have plenty of time for reflection and I tried to think up something that would be of interest to you, and the more I thought of it the more forcibly there came to my mind a story that was told to me recently of a land and lot boomer, from Wichita, Kansas. This land boomer from Wichita, it seems, was in the habit of going away from home to other states to sell Wichita lots and lands to outside people. One time when on an eastern trip, after he had finished his business, and while waiting for a train, he sauntered around to the suburbs and noticed a fine residence with carriages outside, and a number of people going into the house. So he went in and sat down. He found it was a funeral of the owner of the place, so he sat down and listened to the music and the remarks of the pastor, who was very profuse in the words of praise for the charitable and benevolent character of the deceased. When he was through, this stranger rose to his feet and said: "Ladies and gentlemen, I am a stranger in this town; in fact this is the first time I was ever here. I have listened to the beautiful music and heard the glowing words of tribute from your beloved pastor as to the character of this man here who lies dead, and I am very much impressed with the fact that I have missed a great deal in my life by not having been acquainted with him. But as I do not know anything about him I am unable to say anything in his favor, but if you have no objection I would like to make a few remarks about Wichita."

I relate this story because after talking about my own farm and my own county and showing you pictures which may look like boasting, if you happen to think that I am like this man from Wichita, I wish you would kindly place the blame where it truly belongs, and that is with your good secretary, Mr. Bassett.

In 1909 I wanted an orchard and I secured some wild land in the

vicinity of Manistee, and started in to clear it. Along in the spring of 1910 I went up and saw Paul Rose. After getting acquainted he said: "Are you not a little old to start in to raise a young orchard." I probably don't look even as old as I am, but I am not as old as Paul Rose anyway.

Well, I wanted to get this land cleared and I went at it and have been successful in clearing up 310 acres of this land and have 200 acres under cultivation and planted to trees. I have tried to adopt the most improved method used in successful clearing of land on a large scale. One of the cardinal points that I have tried to follow out all the way through is to *keep busy all the time*. You lose time on account of bad weather any way, but by planning our work ahead and carrying it forward with diligence we have been able to accomplish what many seem to think is quite extraordinary.

Our first operation was brushing. I secured two men to cut the brush and then cut the trees down, saw them up, cut off the small stuff like 2½ inches in diameter, then trim up these tree tops and what could be made into wood use it that way and the other burn. Our next thing was to go in on that land with teams and chains and do what we called snagging, that is, hitch these chains on these stumps and pull them out with the horses. This is the second operation. Then we would take by hand and pile up these roots and burn them up and get them out of the way.

Our idea all the time in clearing this land is to get our table clean; get the surface free from obstructions.

The third operation is to do the block work; that is, take a block and tackle and fasten on the end of this block, use one block for hitching block and the other for pulley. We used one-half inch cable wire. Hitch one of these blocks on the heavy stump, put a chain around another stump and then hitch the horses on and pull these out with this cable. We used 100 feet of cable. You can pull everything around a radius of 75 feet, and then go on and set up your machinery again. These stumps we pile up and burn. Then we have our table cleared ready to use the big machine. The machine I have used is a large lever machine, called the Stalwart. They claim that the machine will lift 500,000 pounds. This machine is set right over the stump, hitch on the team and begin the work and out comes the stump. Sometimes we would not get the large stumps out at one pull, but we have taken out stumps five feet across with roots two feet around.

A Voice—Why did you not use dynamite?

Answer—We do use it but we don't use the dynamite until after the stumps are out, and we do it in order to facilitate removing them into piles.

As this work is quite hard on a team we put one team in the forenoon, and another team in the afternoon.

A Voice—How many stumps can you pull in a day?

Answer—I could not answer that definitely. One day we might pull two or three times as many as another day. In pulling these stumps they are pulled right up straight in the air. We dig holes under the roots of the stump, put the chains under the root and fasten to the lever of the machine by grab hooks, and then as the team goes out on the cable line the stump comes up, then the men with long bladed ditching

shovels would cut the dirt loose, and then the team would go forward again until the stump was cleared from the ground.

Question—How do you get rid of these stumps?

Answer—In regard to getting rid of these stumps would say that after we get them on top of the ground we would not do any piling until we had cleared off 40 acres or more. Generally we have 40 acres on hand, and then we would suspend other operations until they were cleared up. Our method of piling these stumps was to attach a long arm or lever which we call a gin pole. It is attached to this machine and raises and lowers. The arm of the machine is thrown sidewise and there is a catch on the end and then the belt holds the stump until from below there is a release of it.

We would start pulling stumps—we would set this machine and pull in a number of stumps with the horses to form a base for this pile and then pile these stumps all together, sometimes as high as they could be made, and the piles would contain hundreds of stumps, and then fire was set to them and burned. On 40 acres we would have about ten such piles, and they would all burn up, either wet or dry.

A great many people said to me "You should not do this, for you will injure your land." At first I did not know but I would, but I wish to state after burning these immense piles of stumps we would go in, before the land was cultivated, with an ordinary road scraper and scrape these piles of ashes out over the land, and I wish to state that where we have planted both cherry and peach trees, some of the best growing trees are growing right where we had these stump piles. I have my own theory about that, and that is, it is the lime in these ashes which benefits these trees. I do not think the burning of stump piles in a clearing of land does any damage, although it may be that forest fires running over land may burn out the humus and do considerable damage.

After these stumps have been piled and burned, we then go over this land with a jumper—it is nothing more than an ordinary sled with wooden runners, that a team of horses will draw, and go over the land picking up the roots and everything on the surface, and haul back together in piles and burn them, and then the land is well cleared. We get in on it to do ploughing in the fall. Then after the land is ploughed we go in with our jumper and pick up everything that has been thrown out on the surface, such as roots, etc., that have been turned up by the plow. After this operation we finish by ploughing, and thus the land and our work is finished all but the planting in the spring. Although in the fall of the year we make a practice of having our land surveyed and set with stakes for the trees. It is cheaper to plant your trees on a large plat by the aid of a surveyor's crew than to line it up yourself. I paid a surveyor for his work \$6.00 a day, he paid his helpers \$1.75 a day. I took this surveyor and this crew and they surveyed and I found that they could set a good many more stakes than any home made crew that could be had, and then there is the satisfaction of knowing that everything is done right, and then your trees are lined up properly, and especially on rough or rolling land. Another practice which we make is of securing our trees in the fall and heel them in for the winter. I have a carload of trees now on the way which I expect to heel in as soon as they arrive. Mr. Paul Rose who has been the father of this

greenhorn who is now talking to you, has been our inspiration and help through all of our efforts, and it is under his advice that I get my trees in the fall rather than in the spring. I wintered 3,200 peach trees and then out of these 3,200 which I planted in the spring, I lost but 28 trees, which is much less than 1%, but I do not think that fruit growers will have a loss of more than 1% if they winter their trees on their own land.

(Following this were shown a number of very interesting lantern slides, illustrating Mr. Merritt's work.)

REPORT OF SPECIAL COMMITTEE.

Your committee appointed to consider plans for the better grading and marketing of our fruit report as follows:

We recommend the establishing of fruit marketing associations wherever fruit is grown in sufficient quantities to warrant it, and the co-operation of these associations already organized for the purpose of getting uniform marketable grade and for the marketing of the same.

We recommend the adaption of the Sulzer law and the encouraging in every way the adaption and enforcement of the same by all Michigan growers of apples. We recommend that this society,—The Michigan State Horticultural Society, take up the organizing of local societies for the purpose of grading and marketing their products, especially the apples, with a view of a federation of all societies whose object is better grading and more profitable marketing of our fruits.

We ask the hearty support and co-operation of every Michigan fruit grower to help make the Michigan apple a standard of quality, a profit to the grower and as economic food to the consumer, by cutting out all unnecessary expense between the produce and the consumer.

VARIETIES OF FRUIT.

THOMAS SMITH, CHICAGO.

Mr. Chairman, Ladies and Gentlemen: I think it proper and appropriate in this church where we are assembled, that we just pretend we are in a Sunday-school class. I am not going to do very much talking but I would like to have every one of you take part, ask me questions, and it may bring to mind the very things I would like to have said. I am not a public speaker but I am a practical man and perhaps it was because of this fact that Mr. Bassett asked me to take up the consideration of this topic with you.

As I look into your faces, I can see many that I am sure could do as well or better than I can, but I will do the best I can.

I am glad to be with you this afternoon and as a starter in the hope of bringing further questions from you, I would like to ask this one: Those of you who think that the Northern Spy is the best apple grown raise your hands.

A Voice—Best to sell or best for eating?

Mr. Smith—Best all around apple.

(There was quite a general response.) Now you who do not think that it is the best apple raise your hand.

The question seems to be divided—there are about as many hands for one side as the other. Personally I think the Northern Spy is the best apple there is, although it is rather hard to keep. Out of fifty thousand barrels, if you get four or five thousand that are prime you will do pretty well. We can sell that apple for more money than other apples. We, however, are obliged to put our best men on them when we come to packing. It has lots of quality but the skin is very tender. It will not keep as well as the Baldwins but when packed right we can do better with the Northern Spy than with any other apple.

A Member—Do you think it will excel the Steel's Red?

Answer—Yes, although we consider the Steel's Red a great apple. There are many things in common, with these two apples. Neither of these apples will turn brown in cold storage. We have trouble with the Greenings and the Baldwins, also other varieties. This is a great thing to know from a commercial standpoint. I sold a friend of mine a barrel of Wagners. This man had a rather warm place to keep that barrel and I did not hear any more about it until the first start of spring and then he came down to the store and said to me: "That barrel of apples you sold me have turned out to be Russetts." (Laughter.) What I am telling you now, I think is commonly known by you, but I would like to get some of your ideas, for I am sure you all have reasons why you think this or that apple to be the best, both as a seller and for eating purposes. Personally, I think from a commercial standpoint the Michigan Greening is very superior to the Greening grown in other states. We could get Greenings from New York and other places but your Greenings with the blush on them will keep for a month longer than from any other point, without turning brown. The Michigan Jonathan, I think, has lost some in quality and they are also under-sized. However, Jonathans from Michigan will keep longer than from any other part of the country.

A Member—Longer than the Missouri Jonathans?

Mr. Smith—Yes, sir. I have been in the apple business for twenty six years and that is what we feel to be the facts in the case. The Jonathan apples from Missouri or Illinois seem to have a little better flavor than those from Michigan and they are not as good keepers as are your apples. The Jonathans from these two states seem to have a very distinct flavor. I cannot tell why this is so but I know that this is true of other apples. For instance, you cannot raise the Northern Spy in Virginia at all for it is a fall apple. It ripens early even in the mountains of Virginia. The Northern Spys belong to the North. You cannot raise Northern Spys in Missouri or Illinois. The Steel's Red, Northern Spy, Greening, King, Russetts, Snow, Mackintosh, belong to the north. Grimes Golden is in the same class as the Jonathan and where one will grow the other will grow. Sometimes we get good ones from Iowa but usually they are rather small. They grow better in the south. They need much warm weather.

A Member—What about early apples?

Mr. Smith—Of course, the Duchess, Wealthy and Alexandria are good specimens. Oftentimes we have both as the appearance and as a good apple. There is another apple which is a fine one and that

is the Twenty-ounce Pippin. There are many of these in New York. They always sell well and are a wonderful apple to bake and cook. They sell from the time they are harvested until the first of the year. After that time they seem to lose out in flavor.

A Member—They are subject to the blight, are they not?

Mr. Smith—I do not think they are so much so as the Alexandria. I have an orchard in New York where we grow Twenty-ounce Pippins. We had two thousand barrels on it last year. There are seasons when the blight works on them more than at other times but we do not think they are especially subject to it. You know we didn't use to think that the Northern Spy would blight, but we have changed our minds on that point. I think the larger you can raise a good apple the better it is.

A Member—What about the Hyslop?

Mr. Smith—They have sold well for several years and they would apply to the Hyslop Crab. People went out of the growing, a few years ago for they sold as low as one dollar a barrel in Chicago. I would not favor the growing of these—I would rather grow something that would be good from the harvest to the end of the growing season. The Kink is a wonderful apple. We have here in this an apple with good size and flavor.

A member—It keeps well but for some reason or other it has never been popular.

A Member—Would you plant them?

Answer—No I wouldn't. The trees do not bear extra heavy and I do not think they have the quality that they should have.

A Member—Where did you class the Spitzenberg?

Answer—This is one of the highest flavored apples there is, but it has long been on the market but it is not considered a good flavor. They can raise them in some parts all right especially in the West.

A Member—Do you sell your apples in barrels or boxes?

Mr. Smith—We sell barrel apples. I enthuse over the flavor of apples that are packed in barrels. I think we can get a flavor in barrel apples that we do not get in boxes. I know a man who deals in apples and he buys his Northern Spies in boxes, but he repacks them in barrels; for the people seem to like them better that way than in boxes.

A member—Tell us a little more about the Western Spitzenberg.

Mr. Smith—The Western Spitzenberg has the appearance and has a very distinct flavor, but our Spitzenbergs do not get the size of the King and Northern Spy and I would rather grow Jonathans.

A Member—What about the Duchess. Do you think it advisable to continue setting Duchess—is there not a danger of over-production?

Mr. Smith—I have my own opinion upon that and you may take it for what it is worth. I would not go too far north with the Duchess. You get better results in the middle part of the state. There are, however, other apples like the Wealthy that fill in all right from the northern parts.

A member—How long can you keep apples in cold storage?

Mr. Smith—Until July or August.

A member—In setting out an orchard what proportion would you set to Baldwins for Michigan?

Mr. Smith—Baldwins sell well, but for my own part I would rather

go after a higher grade of apple. Being excellent bearers, a good many get even as much or more out of their Baldwins than other varieties, even though they sell for less. They are a good winter apple, but I would rather run to a higher grade of apples. In New York State I know of some parties that had Baldwins, and parties came to buy and they did not care for their Baldwins, but their twenty-ounce Pippins were what they liked and the whole lot was sold on this account.

A Member—What do you say about the Greening?

Mr. Smith—They are all right and always yield well and sell well.

A Member—How about the Wine Sap?

Mr. Smith—That is not a Michigan apple.

A Member—How about the Yellow Transparent?

Mr. Smith—Yellow Transparent is a pretty early apple. I would rather have a Wealthy or Duchess or Alexander than the Yellow Transparent.

A Member—What do you think of the Wealthy?

Mr. Smith—It is a splendid apple. It is an early fall or winter apple. They will keep until after the first of the year. They grow large and bear early and we consider them a well-colored apple and they ship well.

A Member—What about Sutton's Beauty?

Mr. Smith—We have handled some of them, but they have not been such a popular apple.

A Member—What about the Chenango?

Mr. Smith—For a table apple it is a dandy. They are, however, rather tender and must not be put in storage. They are short keepers.

A Member—What about the Wagoner apple?

Mr. Smith—It is a splendid apple.

A Member—Would you plant many of them?

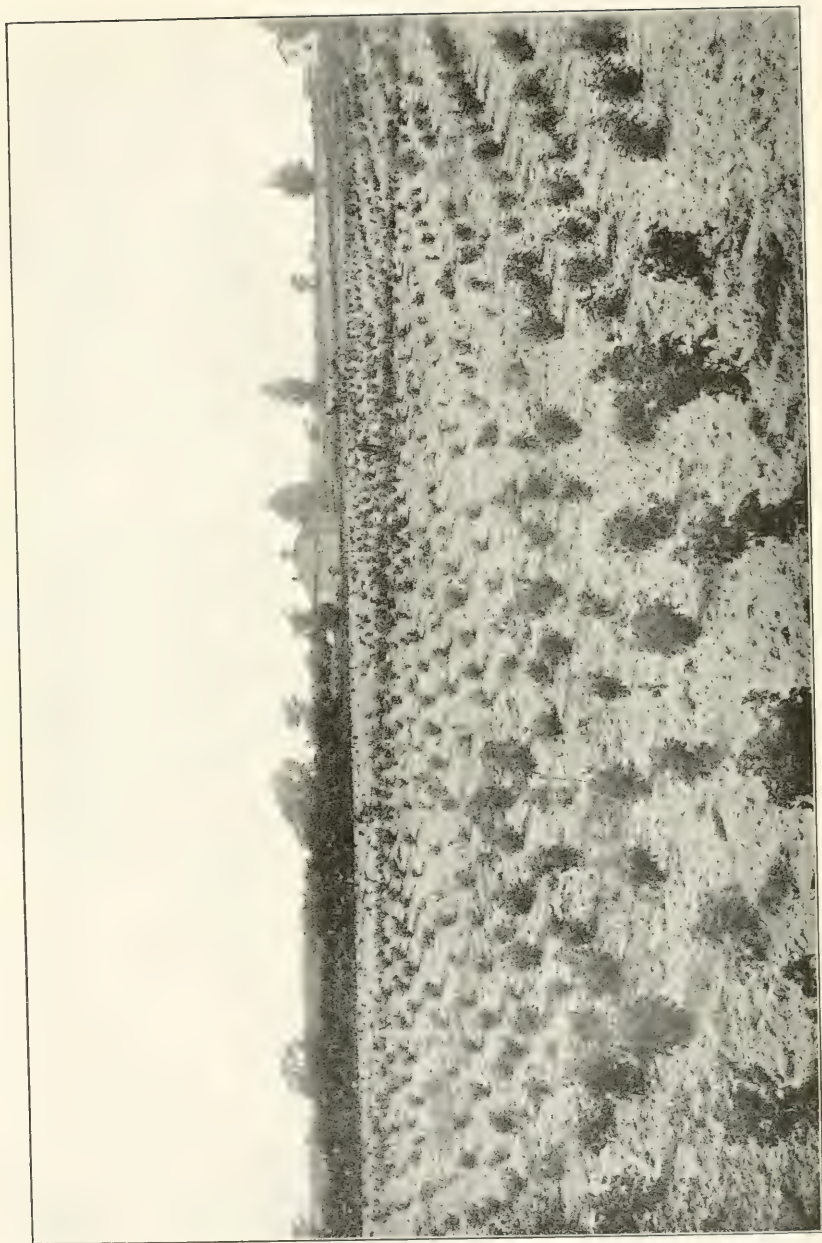
Mr. Smith—I should not. The tree is quite long lived and a fairly good bearer, but turn brown and are not as desirable in this respect as some other varieties.

A Member—What about the None Such?

Mr. Smith—It is a good apple.

A Member—If you planted twenty acres of three varieties, what would you plant?

Mr. Smith—I would plant Canada Red, Spy, Snow or McIntosh. And right here I would like to say that you should not call them Canada Red, when you mean Steele's Red; for these two apples are different. The Canada Red will turn brown and has nothing like the same flavor as the Steele's Red.



John Western's fruit farm in Milton township, Antrim county. 35,000 Red Cross, Victoria and London Market Currants set among 1,000 Wealthy apple trees, set one year.

LESSONS FROM WESTERN APPLE GROWERS.

C. E. BASSETT, FENNVILLE.

The average farmer is not a good business man. That is a harsh statement, but we may as well face it and make the most of it. If we ever take a look at our competitors it is to become jealous of their successes or to gloat over their failures, rather than to study their methods so as to adopt what brings success or avoid the plans which lead to defeat.

It is reported that within two years the Pacific Coast will have over 15,000,000 bearing apple trees. That is interesting to the eastern grower, because he ought to plan his work so as to meet that competition. My home town of Fennville, in western Michigan, is known to very few of my readers—is hardly on the map, so far as you are concerned—and still it ships about as many apples to cold storage every year as does the world-wide known Hood River valley. Western New York and southern Pennsylvania also have points that excel Hood River in the quantity of apples grown and shipped, but it is in the quantity and natural quality that we lead, while it is the finish and excellence of pack that has put the Pacific coast points on the map in big red letters.

We all have a general knowledge of western conditions, but it was this summer, while visiting that section, that I had an opportunity to study their problems by seeing for myself and by talking with the growers. The western land agents know just how to use the brightest tints of printers ink when describing their wonderful land bargains and their use of superlatives is sufficient to put the advance agent of the modern circus completely in the background.

Among the many horticultural leaders that I met and conversed with was the head of one of the large fruit exchanges, who seemed to take as much interest in eastern fruit progress as in what was being done in his own section. He was keeping a sharp eye on what his competitors were trying to do and on the probable effect it would have on their business. As I told him of the reviving of interest in horticulture in the east, the rejuvenating of old apple orchards, etc., I said, "What are you going to do with these high-priced orchards when we get our methods improved and our organizations for fine packing completed in the east?" What do you suppose his answer was? "You will never do it!" He practically told me and, through me, he tells you that the Pacific coast grower relies on the lack of business of the eastern grower—upon his laziness, his shiftlessness, his dishonesty, if you please. Was he right? I put it up to you. Did he tell the truth or is it a libel upon the manhood and womanhood of our eastern growers? Your answer must come in the work that you do in the future. Acts speak louder than words and if we continue to practice the slack methods of the past, that man told the truth and we will deserve our fate. But

I don't believe him. I have faith in the latent honesty and business ability of our eastern growers.

The western growers went there mostly from the east and crossing the Rocky Mountains did not especially work a miracle in honesty or business ability. But their disadvantage of high priced lands and their distance from market have worked out to their advantage. My home town is only a few hours from Chicago—the largest distributing market in this country—and, since we can ship anything to Chicago and get something for it, most of us are raising anything, shipping everything and are getting a little of nothing and then, to cap the climax, are trying to lay the blame on everyone except the right party—ourselves.

Next to the disadvantage of distance from market, the other disadvantage that works out to their advantage is the inflated price of land. This compels the western grower to practice intensive cultivation, as compared with our extensive cultivation. An Illinois farmer sold his 110 acre farm and invested the entire price in 10 acres of apple and pear orchard in Oregon and on that orchard he was hiring as much help and using almost as many horses as he formerly used on his big farm in Illinois. Think of it! No wonder that he produced the very finest fruit that sold at the highest price. If you and I would let about three-fourths of our land lie in grass or simply rest and then on the balance of the land devote all of our usual energy and brains, we might not produce quite as many bushels of fruit, but we would have nearly as much of a much higher quality and our profits, reputation and happiness would be increased many fold.

When you stop to think that the price the western grower pays for transportation alone to my home market would be a big profit for me in my business and that I do not get it, simply proves the statement with which I started—that I am not a good business man. I wish that I could drive home to you the insult, if you have any manhood in you, that that man gave to us when he said we would not do these things. He did not say we couldn't; he did not say that we lacked natural advantages, but he said we lacked nerve; that we lacked the western spirit of "get up and get." That statement rankles in my breast and it ought to in yours, God gave Michigan, Pennsylvania, New York and all this grand country wonderful opportunities and if we fail, no one is to share the blame with us.

The western apple excels in what I call "finish" and in addition to freedom from insect and fungus injuries, that finish is largely due to high color. Just as long as attractivenesses to the eye is the first standard by which the buyer selects his purchases, richness of color will be an essential. While our best fruit authorities may disagree as to the possibilities of increasing color in fruit by the application of potash, phosphoric acid or other chemicals, no one can deny that the one great cause for color is sunshine—God's great gift to man. While the west may have a little more of sunshine, on account of their dry atmosphere, do we not have sunshine here in the east? The chief point of difference lies in the fact that the method of growing trees in the west is such as to make the greatest possible use of that sunshine, while we in the east are so anxious to get an immense amount of bearing wood on our trees and also crowd our trees so that they interlace, thus

making our orchards appear more like a forestry proposition. Their trees are low and with open heads—vase form. In our greed we leave so much brush in our trees that a sparrow can hardly fly through them. We overwork our trees and then starve them. They restrict their trees by severe pruning and thinning of the fruit so that the trees can do their best and keep it up. In trying to discourage us the western land agent says we could not have their kind of open heads, that "The sun scald would kill our trees." Don't you believe it. The only disease we need fear in the east is "dry rot" and the most violent form of this disease is where it attacks the man rather than the tree.

While we must be more thorough in our spraying, we must practice more intelligent pruning and thinning of fruit if we want the high grade that is skimming the cream from our own markets. I know that some of my eastern horticultural friends are issuing words of caution for fear that we will prune too much, and thus "upset the balance" or do something equally unwise. Did you ever stop to consider that our "forestry" methods have been standing us on our heads so long that we have lost all thought of any "balance?" What, pray, will restore the "balance" to a starved root system, but to restrict by pruning the heavily loaded top? An overloaded and starved team are first relieved by removing a part of the load. Where you find one grower who has made the improbable mistake of pruning his orchard too much, I can show you thousands of growers in leading fruit sections who do not prove enough and hundreds of others who do not prove at all.

When the western grower sees an imperfect apple on his tree in the growing time, he realizes that that fruit can never grow to be anything but a cull and it is at once taken off to make room for other fruits. They grade their fruit on the tree and they know that it takes as much of the vitality of the tree to ripen a cull as it does to put the finish on a perfect fruit. In the east the practice is to leave all the fruits that set until harvest time, then paw them over on the packing table to find enough fairly good specimens to face out the barrel. What happens after that we blush to relate. You say it costs money to thin apples. Does it cost any more, or even as much, to pick off the extra fruits and break up the clusters in June, dropping the little culls on the ground, than to wait until harvest time and then pick the whole mess (and, by the way, that is a very good word) carry them down the ladders, pour out on the packing table, sort them and put the culls in the cider lot or in a more improper place?

Not only do we fail to grow as good fruit as we might, but we have had no system of grading and packing. Why are people not eating and cooking more apples? Have they lost their taste for apples? Why is the demand for bananas, oranges, grape fruit and western apples increasing while our own superior quality apples go begging a market? You know the reason. The man who buys a barrel of our apples buys them under a suspicion and pays a price accordingly. All business is and must be based on one principle—confidence. The average eastern pack of fruit does not commend the respect of the consumer and the man who starts out to pack honestly and then market in the old way generally finds himself in bad company and too often suffers as did "old dog Tray."

But the Sulzer bill, which took effect last July, offers us a means of establishing a reputation and of being known as packing an honest grade, for which the consumer will eventually call and pay a good price. Let us adopt this new law and then by modern systems of distribution, through cooperative organizations, modeled after the western methods, we will enjoy increasing demands from a satisfied purchasing public, our markets will be steady, prices will be good and we will possess the confidence and respect of our customers and have that self respect that comes from a feeling of work well done.

GENERAL TREATMENT FOR APPLE ORCHARDS.

Special Bulletin No. 61.

BY H. J. EUSTACE AND R. H. PETTIT.

In the winter or early spring, inspect the trees for San Jose, scurfy or oyster-shell scale. (Send twigs and strips of bark to the Experiment Station, if you cannot identify the scale yourself.)

These scale insects, especially the San Jose scale, must be destroyed promptly or they will kill the trees.

JUST BEFORE THE BUDS OPEN, if the scale be present, spray with the *strong* lime-sulphur wash. To be successful, the work must be done very thoroughly—this means that *every part* of the tree must be covered with the spray.

JUST BEFORE THE BLOSSOMS OPEN, OR WHEN THEY ARE "IN THE PINK," a spraying must be made to prevent scab and other fungous disease and the canker-worm, bud-moth and a few other insects. For this and the sprayings that follow, use the dilute lime-sulphur or the Bordeaux mixture. To every fifty gallons, add two or three lbs. of arsenate of lead. (With lime-sulphur, this is the only poison that can be used.)

IMMEDIATELY AFTER THE BLOSSOMS FALL, and before the calyx closes, another spraying must be made just like the one before. At this time direct the spray downward from above as much as possible, and with the highest pressure available, the object being to get some of the material into the calyx cups, to poison the larva of the codling moth when it attempts to enter.

This is a very necessary spraying. If well done it usually means a crop free from worms.

ABOUT TWO WEEKS AFTER THE ABOVE SPRAYING, make another. Use same mixture and poison as in previous spraying.

EARLY IN AUGUST, there will be a second generation of codling-moths. Just when this will occur for your locality can be determined. (See "When the codling-moth flies" page 168.

Protect fall and winter varieties against the codling-moth and a possible late outbreak of scab. Use the usual amount of poison, but the *dilute* lime-sulphur, or the Bordeaux which can be made somewhat weaker than before.

THE LESSER APPLE-WORM, which works more superficially than the codling-moth, when present requires a spray of poison when standard winter varieties are from 1 to 1½ inches in diameter.

IF PLANT-LICE are present and if they do not leave the foliage shortly after the blossoms fall apply some contact spray. (see page 167) preferably nicotine or strong tobacco tea. If the 40% nicotine is used add ½ pint to 45 gallons of water and be sure to hit each louse.

FIRE BLIGHT has been very serious in apple trees in some parts of the state during the past few years.

For description and method of control see "TREATMENT FOR PEARS" on page 153.

GENERAL TREATMENT FOR PEACHES. .

Inspect for scale insects, the same as for apple, and spray with *strong* lime-sulphur wash the same as directed for apple trees.

If this spraying is made, it will also prevent the leaf-curl disease. If the lime-sulphur spraying is not required, a spraying must be made to prevent the leaf curl which is often especially serious on Elbertas. For this spraying, use Bordeaux mixture or the copper sulphate solution (2 pounds of copper sulphate dissolved in fifty gallons of water). It is very important that this spraying be made *before* the buds swell. If made after that time, it will not be successful in preventing the leaf curl.

If the fruit in your orchard is commonly affected with the rot and the scab (the small black specks usually on the upperside) and the curculio ("the insect that stings the fruit")—and most of the peach orchards in Michigan are affected with all of these—make sprayings as follows:

JUST AFTER THE BLOSSOMS DROP AND MOST OF THE "SHUCKS" HAVE FALLEN OFF, spray with poison, using 2 pounds of arsenate of lead in every 50 gallons of water.

(See under arsenate of lead page 164.)

Never use any arsenical other than arsenate of lead, on peach.

TWO WEEKS AFTER THE PREVIOUS SPRAYING, another must be made. This time use the self-boiled lime-sulphur and to every 50 gallons add 2 pounds of arsenate of lead. The *dilute* lime-sulphur has not been generally satisfactory on peaches. Even when *very dilute* some burning of the foliage has resulted.

ABOUT ONE MONTH BEFORE THE FRUIT RIPENS, spray again and the same as directed above.

In orchards where the curculio is not present or not serious, the spraying recommended "Just after the blossoms fall" can be omitted.

Self-boiled lime-sulphur settles rapidly, so keep well agitated and do not add the arsenate of lead until just before spraying. Use fine nozzles and give the trees a uniform coating of a mist-like spray.

PEACH TREE BORER. Dig out by hand early in spring or late in fall at points where gumming shows. Sterilize knife with carbolic acid to prevent spreading crown gall which may be present.

"PEACH YELLOWS" AND "LITTLE PEACH."

These two diseases are extremely infectious and very difficult to positively identify. Their causes are unknown and the only method of control is destruction of the tree—fruit, root and branch—as soon as discovered. It is especially important that diseased trees should not be allowed to blossom as it is believed the disease is spread by insects at that time. Both old and young trees of all varieties of peaches and probably all varieties of Japanese plums are susceptible to the two diseases. Both diseases may be present in a tree at the same time.

PEACH YELLOWS. The first symptoms in a young tree, previous to bearing, are indicated by the leaves of one or two limbs turning from a rich dark green to a "yellowish green or reddish rusty green" color; this is accompanied by a rolling of the leaves from their edges. These leaves ripen and fall earlier than normal leaves. The fruit buds are larger and more mature in appearance and in the spring will invariably bloom earlier than healthy buds. In some instances, the symptoms are not confined to one or two branches, but many of the leaves in the center of the tree turn yellowish or light green, roll slightly from their



PEACH YELLOWS.

A six year old peach tree in an advanced stage of the "Yellows."

edges and droop considerably. These latter symptoms are often present in cases of "Little Peach."

Upon bearing trees, there may be any one or all of the following symptoms: the fruit may ripen prematurely—one to three weeks—upon one or two branches or over the entire tree. The fruit may have numerous red spots on the surface, the spots sometimes extending in red streaks partially or wholly through the flesh to the pit. Often the flesh, about the pit, is full of radiating streaks of red. The surface of the fruit may be smooth or considerably roughened and the flesh more or less stringy and very insipid. The leaves may be yellowish pale or reddish rusty green in color, usually rolling and drooping. In advanced stages, numerous finely branched shoots bearing many slender sickly leaves,

appear on the trunk or main limbs and sometimes in the extremities of the branches. *Finally the tree dies.*

Winter injury to the bark of the trunk or main limbs, mechanical injury by mice, rabbits, peach borers, cultivators, etc., or a serious lack of moisture or nitrogen in the soil may discolor the foliage and cause premature ripening of fruit and should not be mistaken for "Yellows."



PEAR BLIGHT.

On left: Pear blight in a bearing tree. The blight should not have been permitted to spread as far as it has in this tree. On right: Pear blight in a young tree.

LITTLE PEACH. In "Little Peach," characteristic symptoms are: the leaves of a part or the whole of the tree have a bunched appearance, and are shorter, and broader than normal leaves. They are usually yellowish-green in color with the veins appearing dilated and darker than the intervening tissue. The fruit is usually under size and ripens from a week to two weeks late. The flesh is more or less stringy, watery and very insipid while the pit is usually very small. One or all symptoms may be present and unless they can be positively attributed to some other cause, the tree should be condemned, pulled out and burned.

GENERAL TREATMENT FOR PEARS.

Inspect for scale insects and if present, spray before the buds start with *strong lime-sulphur*. The *Pear Blister Mite* (a mite that causes thickened red and brown spots on the leaves) and the *Pear Psylla* may also be partially controlled by this spraying for scale. If these pests were serious last year, make the strong lime-sulphur spraying even if not needed for the San Jose scale.

APPLY THE SAME GENERAL TREATMENT TO PEARS as is given for apples. If the *dilute* lime-sulphur is used, it should not be as strong as for apples (see dilution table on page 169.)

PEAR BLIGHT OR FIRE BLIGHT was very serious last season in many parts of the state. It is easily noticed; a branch dies back from the tip, leaves turn brown, wither, but do not drop. Is caused by a germ that works within the twig and hence spraying is not a preventative. It usually is more serious in rapidly growing trees and for this reason, many pear orchards are left in sod. Cut out the diseased twigs and branches. Make a frequent and systematic inspection of every tree and cut out every diseased twig and branch found. Cut several inches below where the wood appears to be dead. Carry the dead portion out of the orchard and bury or burn. After every cut, wipe off the wound with a cloth or sponge moistened with a 5% carbolic acid solution.

If slugs appear, spray with an arsenical, if not too near ripening of fruit to be dangerous. In case of early pears *fresh* hydrated lime may be dusted on.

GENERAL TREATMENT FOR PLUMS.

Plum trees may be infested with the San Jose or by the European fruit scale. The treatment for them is the same as recommended for scale on apples. (Page 149.)

JUST BEFORE THE BUDS SWELL, spray with the *dilute* lime sulphur (or the Bordeaux mixture) and arsenate of lead, 2½ to 3 lbs. to a barrel. This is to prevent leaf-spot, fruit rot, black knot and curculio.

Arsenate of lead is preferable to Paris green on all stone fruits, owing to tenderness of foliage in such fruits.

IMMEDIATELY AFTER THE BLOSSOMS FALL, it is very essential to make another spraying using the *dilute* lime-sulphur or Bordeaux mixture or *self-boiled* lime-sulphur, and two pounds of arsenate of lead to every 50 gallons. (For the Japanese varieties use the self-boiled lime-sulphur or dilute the Bordeaux one-half.) This spraying is to prevent the leaf diseases, fruit rot and curculio. Be sure it is made *immediately* after blossoms fall. Our experiments last year showed that dilute lime-sulphur was very satisfactory on plums and it is easier to prepare and spray than Bordeaux or *self-boiled* lime-sulphur.

TEN DAYS OR TWO WEEKS LATER, it will pay to repeat the previous spraying, especially if the weather is wet or the curculio is serious. This spraying should be repeated every ten days or two weeks until there is danger of staining the fruit; stopping at least a month before picking time.

On varieties especially susceptible to rot, an application of weak copper sulphate may be made about two weeks before ripening. One pound of copper sulphate to 150-200 gallons of water. No poison need be used.

BLACK KNOT. Early in the spring a careful inspection should be made of every tree, and *all* "black knots" cut out and destroyed. Cut back several inches below the knot. Disinfecting cuts as for pear blight is not necessary. Wild cherry trees harbor the disease and if diseased



SPRAYING MONARCH PLUMS.

Tree on left: Sprayed three times with commercial lime-sulphur (properly diluted). Fruit was protected from rot and foliage remained practically perfect through the season. Photo Oct. 4, 1912.
Tree on right: Sprayed three times with Bordeaux mixture. Fruit was protected from rot and foliage remained practically perfect through the season. Photo Oct. 4, 1912. On an adjoining tree not sprayed, the crop of fruit was entirely destroyed by rot and all of the foliage fell off by August.

ones are near plum or cherry orchards, they should be destroyed, if possible.

GENERAL TREATMENT FOR CHERRIES.

Cherry trees may be infested with San Jose scale. If found, the treatment is the same as that recommended for the apple.

JUST BEFORE THE BLOSSOMS OPEN, spray with dilute lime-sulphur, or Bordeaux mixture. This is to prevent the rot and leaf spot troubles.

Especially valuable on the English Morellos for the latter. Our experiments the last two seasons indicate that the dilute lime-sulphur is just as satisfactory as the Bordeaux for cherries and either is better than the self-boiled lime-sulphur.

JUST AFTER THE BLOSSOMS FALL, make a spraying like the above with the addition of 2 pounds of arsenate of lead to every 50 gallons of spray solution. This spraying is directed against the rot and leaf spot, curculio and slug.

TEN DAYS OR TWO WEEKS LATER, it may be necessary to make another spraying like the previous one for the rot and leaf spot. The need for this spraying will depend upon the susceptibility of the variety to the rot and to the weather conditions of the season.

LARGE BLACK LICE may appear on the leaves at any time. A spraying of tobacco water (see page 167) will destroy them if applied before the leaves curl too tightly.



SPRAYING ENGLISH MORELLO CHERRIES.

On left: Sprayed three times with commercial lime-sulphur (properly diluted). Fruit was protected and foliage remained practically perfect through the season. Photo. Oct. 4, 1912. There was no perceptible difference when the Bordeaux mixture was used. On right: Tree not sprayed. The fruit was of no value and the foliage was entirely lost by mid-summer. The photograph was taken Oct. 4, 1912.

SLUGS sometimes appear after the fruit is harvested, a spraying of arsenate of lead (2 or 3 pounds in 50 gallons of water) will destroy them.

GENERAL TREATMENT FOR GRAPES.

Grape vines are not often subject to attacks by scale insects so there is seldom need for a spraying with *strong* lime-sulphur before growth starts.

Do not use the *dilute* lime-sulphur at any time for grape spraying. It stunts or checks the growth of the berries. Use the Bordeaux mixture.

DOWNY MILDEW commonly called "Red Grape" was very destructive last season and caused large financial losses to growers who did not spray.

BLACK ROT has been a serious disease in recent seasons. Growers cannot afford to risk the loss it may cause by neglecting to spray.

These diseases and others will be prevented very largely by spraying as follows:

WHEN THE SHOOTS ARE ABOUT 8 TO 10 INCHES LONG, spray with Bordeaux mixture for black rot and downy mildew.

JUST BEFORE BLOOMING spray again with Bordeaux mixture for black rot and downy mildew and to every 50 gallons of Bordeaux, add 2 or 3 pounds of arsenate of lead to poison the grape-berry moth, and the rose-chaffer. If this latter is serious use stronger poison even up to 5 lbs. to 50 gallons. A pint of the cheapest molasses added may help.

JUST AS THE BLOSSOMS ARE FALLING, make another spraying like the above.

ABOUT 10 DAYS OR TWO WEEKS LATER, it may be necessary to make another spraying like the two previous, but this will depend upon the weather conditions and the amount of rot and mildew prevalent. If later sprayings are thought to be necessary, some material should be used that will not stain the fruit such as weak copper sulphate solution.

There are several grape insects that are found only in occasional vineyards and then not every year. The grower should keep a sharp watch of his vines for them and if found, take prompt measures to destroy them. (If not familiar with their appearance send specimens to The Entomologist, East Lansing, Michigan.)

Those most likely to be found are the following:

FLEA-BEETLES may appear at any time but are most likely to come as the buds open in early spring. Spray with Bordeaux mixture and a strong poison, 3 or 4 pounds of arsenate of lead to every fifty gallons of the Bordeaux; if early in spring. Later use less poison.

In vineyards where the grape-berry moth is serious, spray with Bordeaux and an arsenical poison during the middle of July, before the 20th.

For leaf-hoppers, sometimes incorrectly called "Thrip," spray with nicotine or with kerosene-emulsion while the insects are young, and before they can fly. Later in the fall, clean up all rubbish and burn after cold weather sets in.

For climbing cut-worms, use cotton bands or bands of sticky mixture. On tender growth these can be put on strips of paper.

GENERAL TREATMENT FOR CURRANTS AND GOOSEBERRIES.

San Jose and European fruit scale are often found upon these bushes. Inspect carefully for them. If found, spray before growth starts with strong lime-sulphur.

JUST AS THE LEAVES ARE EXPANDING, spray with *dilute* lime-sulphur or Bordeaux and two pounds of arsenate of lead to every fifty gallons.

REPEAT this spraying when the fruit is about one-fourth grown.

If worms trouble after this, use pyrethrum or hellebore.

Leaf bugs or aphids may appear. When they do, spray with nicotine or strong tobacco water while the bugs are red and wingless and before the leaves have become curled.

GOOSEBERRY MILDEW is a fungous disease that is especially troublesome on the English varieties as Industry, Columbus and Chautauqua. Spray with dilute lime-sulphur. Begin when the buds start and repeat every 10 days to two weeks until near picking time.

WHEN PRUNING, if a cane is cut that shows discolored pith, it may indicate the cane borer. Cut back to sound pith. Burn trimmings.

WILTED FOLIAGE at any time indicates the cane borer. Cut out and burn.

GENERAL TREATMENT FOR RASPBERRIES; BLACKBERRIES AND DEWBERRIES.

CUT OUT THE FRUIT BEARING canes after the last picking has been made. This will lessen insect and disease troubles that may be harbored on the old canes and allow more room for the growth of the new canes.

ORANGE RUST may appear in May or June. It is easily identified by the bright orange color on the under side of the leaves. There is no method of preventing this trouble. As soon as it is found, the bush should be dug out and burned. If allowed to remain the disease will spread and destroy many plants.

ANTHRACNOSE, identified by the grayish spots on the canes (also on leaves, but not conspicuous), is common in many berry fields. It does not yield to spraying unless very frequently done with Bordeaux mixture and this may not be profitable. If desirable, make the first spraying when the new canes are 6 to 8 inches high and repeat every two weeks during the growing season.

Cutting out and burning the old canes immediately after fruiting will be of some benefit. In starting a new field, make a special effort to secure healthy plants.

"WORMS" or "SLUGS" might appear at any time. Spray with an arsenical if early in season, but if near picking time, use hellebore or pyrethrum.

Cut out and burn gouty galls, tree cricket eggs or borers in stems.

GENERAL TREATMENT FOR STRAWBERRIES.

Examine the young plants before setting them. Pick off all discolored or diseased leaves. If root lice are suspected, dip the roots in strong tobacco water.

After the growth starts, spray with Bordeaux and a poison to prevent the leaf spot and to destroy the leaf-roller insect that may be present.

For fruiting plantations, spray with Bordeaux before blossoming and

repeat ten days to two weeks later. After fruiting if the bed is to be fruited again, mow and burn over quickly (as on a day when there is a wind, to avoid burning the crowns of the plants). If leaf rollers have been present, spray with poison after the growth has started again, but before the leaves curl.

For strawberry root lice, see Michigan Bulletin No. 244, page 88.

GENERAL TREATMENT FOR POTATOES.

FOR THE POTATO SCAB. Soak the uncut tubers for two hours in 30 gallons of water and one pint of formalin (can be secured of any druggist). This solution can be used several times. Do not put treated tubers back into crates or bags that held scabby potatoes. Make the treatment only a few days before planting if possible. Do not plant upon land that has recently grown crops of scabby potatoes or beets.

FOR THE BLIGHT AND "BUGS." Begin spraying with Bordeaux mixture and poison when the "bugs" first appear, or when the plants are about 8 inches high, and repeat about every 2 weeks as long as the plants are growing. Spray often in warm, muggy weather; fewer sprayings are necessary in dry weather.

Use Bordeaux mixture (6 pounds copper sulphate and 4 or 5 pounds of lime to 50 gallons of water, and put in the poison, about $\frac{1}{2}$ pound of Paris green or 2 pounds of arsenate of lead, or 1 quart of the stock solution of Kedzie mixture).

Dilute lime-sulphur is not as good as the Bordeaux mixture for potatoes.

WART DISEASE OF THE POTATO. This disease also is known as Black Scab, Canker or Cauliflower Disease. It attacks the tubers mainly. In a severe attack, big, dark warty excrescences sometime as large as the tuber itself appear at the sides or ends. In advanced stages of the disease, the tubers are wholly covered by this growth and lose all resemblance to potatoes. In the final stages, the tubers turn to brownish black soft masses, giving off a very unpleasant odor. In very mild attacks, the tubers appear normal, but the eyes are found to have turned gray, then brown and finally black.

This disease is not known to be present in Michigan, but is likely to be found at any time. No remedy is known. When once introduced into a field, the whole crop should be burned and no tuber from the field used for seed purposes. The field itself should not be used for potatoes for at least six or seven years and the disease should be reported together with specimens at the first outbreak or suspicion of outbreak to the Department of Botany, Michigan Agricultural College.

Send specimens in a tight mailing-case.

PREPARATION OF SPRAY MIXTURES.

STRONG LIME-SULPHUR.

Strong lime-sulphur to be used on dormant trees or bushes for scale insects, can be prepared in three ways:

By the old formula,

By reducing with water "the home-made" concentrated wash.

By reducing with water the "commercial" concentrated wash.



A HOME COOKING PLANT.

An outfit for the cooking of the lime-sulphur at home. Water supply tank on the left. The cooking is done in barrels into which are extended perforated steam pipes. The steam is supplied by traction boiler.

The "Old formula" has been used for many years with good results and is very satisfactory. The formula is as follows:

Lump lime	20 pounds
Sulphur (flour)	15 pounds
Water (hot) to make.....	50 gallons

The lime is slaked with a small amount of water (hot if lime is sluggish) and the sulphur is added, fifteen or twenty gallons of water are then added, and the mixture boiled. (It should take three-quarters

of an hour, or an hour of good boiling with frequent stirring.) When done the liquid should be amber colored and fairly clear. Strain, dilute with water (hot is preferable) to make (up to) 50 gallons, and apply warm, through a coarse nozzle.

If small quantities are required, use an iron kettle to boil it in. If larger quantities are to be used, live steam is preferable for boiling purposes, either in a tank or in barrels.

Applied just before the buds swell, it coats the branches in such a way as partially to hinder from settling down, such pests as the oyster-shell, scurfy scale, some aphids and other insects.

HOME-MADE CONCENTRATED LIME-SULPHUR WASH.

Growers, having cooking plants, can make the lime-sulphur wash in a "concentrated" solution. This may be an economy of time, as large quantities can be made early in the season and stored until needed.

It is difficult to make this wash of uniform strength. For this reason, every batch that is made must be tested with a hydrometer and diluted accordingly.

The difficulty of getting a solution of uniform strength, apparently depends on the lime, which varies in composition and strength. Lime that contains more than five per cent of magnesium oxide and less than 90 per cent of calcium oxide does not combine in the cooking with the sulphur in a way to make a good mixture. Special "spraying lime" is now on the market.

There are several ways of combining the lime and sulphur, but always there are two parts, by weight, of sulphur to one of stone lime. The following three formulas are in common use:

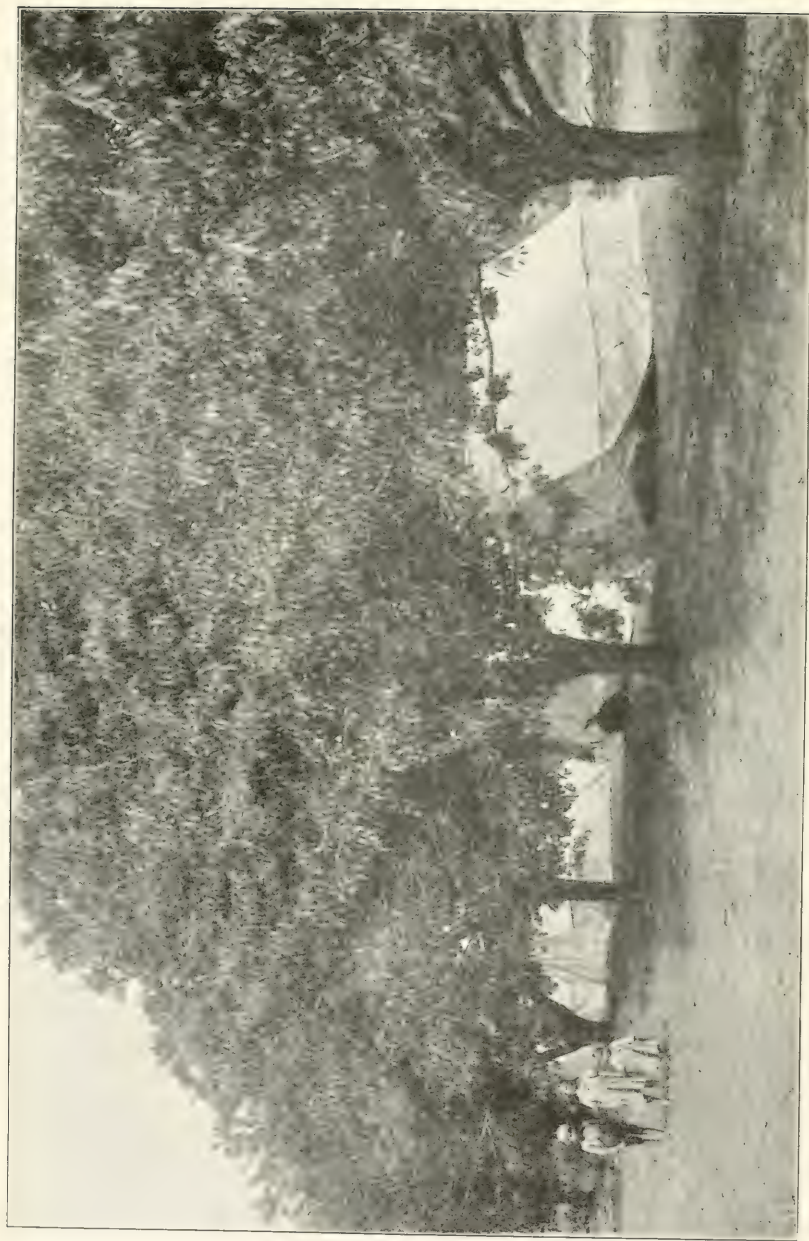
Stone lime 75 lbs. }		{ 60 lbs. }		{ 40 lbs. }
Sulphur 150 lbs. }	or	{ 120 lbs. }	or	{ 80 lbs. }
Water 50 gal. }		{ 50 gal. }		{ 50 gal. }

The lime is slaked to a thin paste and the sulphur is added. Boil for one hour and stir frequently. Water enough should be added so that there will be fifty gallons at the end of boiling.

After it is cooked, if not to be used at once, it should be strained into a barrel which should be air tight, as exposure to the air causes the sulphur compounds to lose their value for spraying purposes. Each lot that is cooked should be tested with a hydrometer when cooled and diluted, according to the dilution table on page 365, when applied:

COMMERCIAL CONCENTRATED LIME-SULPHUR WASH.

There are several brands of the "commercial" concentrated lime-sulphur solution now upon the market. The use of these instead of the home cooked kinds is becoming more and more common every year, especially by fruit growers who do not care to take the time or trouble to cook the material for themselves or if they do not have good facilities for doing so. They are now reasonable in price,—of fairly uniform strength, and do add to the ease of getting ready to spray as all that is necessary is to dilute with the required quantity of water.



Sweet cherry orchard of Paul Rose near Elberta, Benzie county. These cherries have outsold the California boxed cherries in the Chicago market.

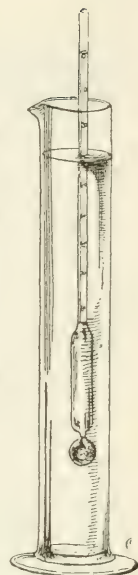
TESTING AND DILUTING CONCENTRATED LIME-SULPHUR.

Every "batch" of the home made concentrated lime-sulphur wash will have to be tested when cooled to determine its strength and it will be well to test the "commercial" brands. This testing is done with a Baume hydrometer. It is a simple instrument used to determine the weight and density of liquids. It is made of glass, is about a foot long, and has a graduated scale on the side.

It is absolutely necessary that the hydrometer be kept *perfectly clean*. If the solution is allowed to dry on it an accurate test cannot be made.

It can be purchased from dealers in druggists supplies or from Bausch and Lomb Optical Company, Rochester, N. Y., Whitall Tatum Company, Philadelphia, Pa., or Taylor Instrument Companies, Rochester, N. Y.

(See page 169 for the rates of dilutions.)



AMOUNT OF SULPHUR IN SOLUTION.

The relation between the "Baume Test" and the sulphur in solution in the commercial or home made concentrated lime-sulphur wash can be determined from the following table.

Density, degrees. Baume.	Total sulfur. %	Pounds of sulfur in one gallon of solution. lbs.
33.....	26.0	2.7
32.....	25.0	2.6
31.....	24.0	2.5
30.....	23.0	2.4
29.....	22.0	2.3
28.....	21.0	2.2
27.....	20.0	2.1
26.....	19.5	2.0
25.....	19.0	1.9
24.....	18.5	1.8
23.....	18.0	1.8
22.....	17.75	1.7
21.....	17.0	1.6
20.....	16.75	1.6
19.....	16.25	1.5
18.....	16.0	1.5
17.....	15.5	1.4

DILUTE LIME-SULPHUR SOLUTION.

For spraying on the foliage of apples, pears, European plums and cherries but not on peaches or Japanese plums, grapes or potatoes.

This solution can be prepared for use in several ways.

First, The "commercial" concentrated lime-sulphur solution can be diluted to the proper strength.

Second, The "home made" concentrated lime-sulphur can be diluted to the proper strength.

Third, The solution can be made at any time and in any quantity as follows: Boil in a few gallons of water for one hour, *twice* as many pounds of sulphur as of lime, strain and dilute with water so there will be 8 pounds of sulphur to every 100 gallons.

Example: To make 100 gallons of spray solution, boil 8 pounds of sulphur and 4 pounds of lime as directed.

SELF-BOILED LIME SULPHUR MIXTURE.

This is a mixture of lime, sulphur and water and not like any of the other lime-sulphur sprays. It does not (when properly made) injure tender foliage and is very valuable for spraying peaches and Japanese plums.

The formula is:

Lump lime	8 pounds.
Sulphur	8 pounds.
Water	50 gallons.

The mixture can be prepared better by using thirty-two pounds of lime, thirty-two pounds of sulphur, and eight or ten gallons of water, and then diluting to 200 gallons.

Place the lime in a barrel and add enough water to almost cover it, as soon as the slaking begins, add the sulphur, which should be run through a sieve to break up the lumps.

Stir constantly and add enough water to make a thick paste and then, gradually, a thin paste. As soon as the lime is well slaked, cold water should be added to cool the mixture and prevent further cooking. It is then ready to be strained into the spray tank, diluted up to the full formula, and used.

Care must be taken not to allow the boiling to proceed too far, if the mixture remains hot for fifteen or twenty minutes after the slaking is completed, some sulphur will go into solution and injury to the foliage may result.

The time of adding the cold water to stop the boiling depends upon the lime. With a sluggish lime all the heat in it may be needed, while with limes that become intensely hot, care must be taken not to allow the boiling to proceed too far.

SOLUBLE SULPHUR POWDER.

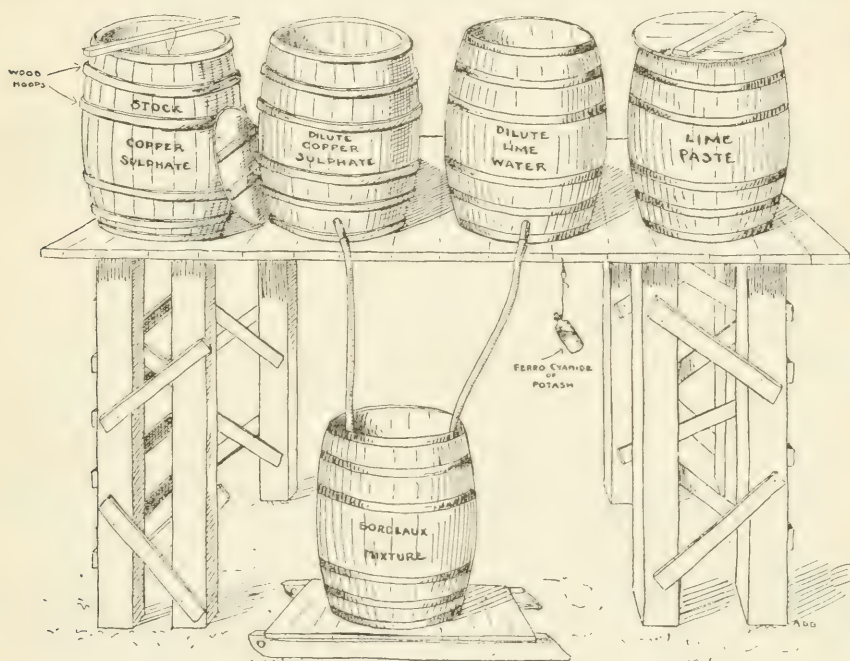
There has appeared on the market a form of sulphur compound that can be dissolved in water, and is recommended as a substitute for lime-sulphur. It has been tested in a limited way by this Experi-

ment Station; one apple tree, badly infested with the San Jose scale was sprayed in March 1912. Frequent examinations indicated that the scale was destroyed. More extensive experiments are in progress.

BORDEAUX MIXTURE.

Bordeaux mixture is made of copper sulphate, lime and water.

These three substances are combined in various proportions, depending upon the kind of plant to be treated. For apples, pears, cherries and plums (except Japanese varieties) the preparation is usually four pounds of copper sulphate, with about the same amount of lime, to fifty gallons of water. Poison is added as needed. The copper sulphate will



readily dissolve in two gallons of hot water, to which should be added enough water to make twenty-five gallons or one-half barrel. Do not use an iron or tin vessel to dissolve this in, as the copper sulphate will destroy it, and besides the iron will spoil the Bordeaux. A wooden pail is good. Slake the lime into a thin paste and add water to make twenty-five gallons. Pour, or let these run together into a third barrel, and the Bordeaux is made. When it is emptied into the spray barrel or tank, it should be strained through a brass wire strainer to catch any of the coarse particles.

Whenever it is necessary to use a quantity of the mixture, it is desirable to have the lime and the copper sulphate in "stock solutions." A quantity of lime is slaked to a paste and held so by being covered with water. The copper sulphate, say fifty pounds, is placed in a clean

gunny sack and suspended in a barrel (one with wood hoops is much to be preferred) containing twenty-five gallons of water. This will dissolve in about a day. One gallon of this "stock solution"* is equal to two pounds of copper sulphate.

A good quick way to combine these three substances is as follows: Put the amount of the "stock solution" of copper sulphate required in a barrel, and add enough water to make 25 gallons, or one-half barrel. Put about 7 pounds of the lime paste in a barrel and add 25 gallons of water, making a thin whitewash. Pour, or let these two run together into a third barrel, or directly into the spray barrel or tank, being sure to strain. When partly run in, test with ferro-cyanide of potash† to make sure enough lime has been used. If Paris green, arsenate of lead, or any other poison is to be used, make it into a thin paste with a little water and add it to the Bordeaux mixture, which is now ready to be used.

COPPER SULPHATE SOLUTION

Is copper-sulphate dissolved in water. It is used by some growers to spray peach trees to prevent the leaf curl where a spraying for scale insects is not required. Two pounds of copper sulphate to 50 gallons of water is strong enough for this purpose.

POISONS USED IN SPRAYING.

For Insects That Chew.

ARSENATE OF LEAD.

This poison is used very extensively. It can be secured for reasonable price, is ready to use at any time, does not easily injure the foliage and is the only poison that can be safely used in the lime-sulphur sprays.

Injury to tender foliage like the peach has occasionally occurred by spraying with arsenate of lead and water when the foliage was moist from dew or rain. If necessary to spray tender foliage (peaches or Japanese plums) at such a time it would be well to add 3 to 5 pounds of slaked lime to every 50 gallons of the spraying material.

Arsenate of lead is usually sold in kegs or "kits" or small barrels in the form of a paste. Some companies have it in a powdered form. This form usually costs twice as much or more per pound as the paste form and since it does not contain much water only one-half the amount in weight should be used as is recommended for the paste form.

A simple, easy way to work the thick pasty arsenate of lead into a thin, smooth paste (as it should be before using either alone or in something) is to put the amount required in a keg; add water and churn with a dasher. This is much quicker than to use a paddle.

* Always stir this "stock solution" before dipping any out, in order that what is used may be full strength.

† This chemical can be secured of any druggist. Ten cents worth dissolved in a pint of water will be enough for a season. Drop a very little in the Bordeaux, if a reddish brown color appears more lime must be added. If there is no discoloration, there is enough lime. Ferro-cyanide of potash is extremely poisonous, so observe great care in its use.



PARIS GREEN AND LIME.

Always use lime with Paris green, it makes the poison stick better, besides greatly reducing the danger of burning the foliage.

For spraying from a barrel, the writer has found the following method very useful: Place from one-quarter to one-half pound of good lump lime, or unslaked lime, in each of three or four tin pails which will hold about three quarts or less. Old cans or crocks will answer just as well. Add enough hot water to slake it into a thin cream or paste. Now add to each lot, one-quarter pound of Paris green, previously weighed out, and placed in paper bags, stir while the lime is hot and allow to stand for some time. Now measure out about forty-four gallons of water in your spraying barrel, and make a mark that will show how high it comes in the barrel, add the contents of one tin pail (viz., one-quarter of a pound of Paris green and one-half pound of quick-lime slaked) into the forty-four gallons of water in the barrel. Stir well and spray. The pails or crocks can be used one at a time and refilled occasionally so that the stock is always on hand ready for use.

ARSENITE OF SODA—KEDZIE FORMULA.

This form of poison was originated at this Station by the late Dr. R. C. Kedzie.

This is a cheap, effective poison that can be prepared at home. It is used by many of the grape growers of Michigan in combination with the Bordeaux mixture. It cannot be used in the lime-sulphur sprays. If used alone—as is sometimes done for potato bugs—slaked lime must be added or the foliage will be burned.

The formula is:

White arsenic	2 pounds
Sal Soda (commonly called washing soda)	8 pounds
Water	2 gallons

Boil these materials in any iron pot or kettle *not used for other purposes* for about 15 minutes or until the arsenic dissolves, leaving only a small muddy sediment. Put this solution into a jug or other vessel that can be closed tightly and label "Poison."

One quart of this solution is equal to $1\frac{1}{2}$ pound of Paris green. For most spraying one quart in 50 gallons of water (with some lime) or Bordeaux mixture will be sufficient.

CONTACT INSECTICIDES, FOR INSECTS THAT SUCK.

KEROSENE EMULSION.

Place two gallons of ordinary kerosene in a warm place, either in a warm room or in the sun, and allow to become as warm as possible without danger from fire. Boil one pound of laundry soap or whale oil soap in a gallon of soft water until completely dissolved. Remove the soap solution from the fire, and while still boiling hot, add the kerosene and agitate vigorously for ten minutes, or until the oil is emulsified, with a spraying pump by forcing the liquid back into the vessel from which it was pumped. When the liquid is perfectly emulsified it will appear creamy in color and will flow evenly down the side of the vessel when allowed to do so. Care should be taken to completely emulsify the oil and this is accomplished much more easily when the mixture is hot.

This strong emulsion may now be readily diluted with water and used, or it may be stored away for future use. When cold it becomes like sour milk in appearance and should be dissolved in three or four times its bulk of hot water before diluting with cold water. If the water is at all hard, "break" it by adding a little sal soda before putting in the soap.

Small amounts of this emulsion may be made by using the ingredients in small quantities, but in the same relative proportion.. It is used at the rate of eight or ten parts of water to one part of emulsion.

HELLEBORE.

White hellebore is the powdered root of a plant. It kills both by contact and as an internal poison. It may be applied either dry or in the form of a liquid. When used dry it should be mixed with three or four times its weight of flour or of plaster and then dusted on the insects. Applied wet, one pound should be mixed with twenty-five gallons of water and this liquid applied as a spray.

INSECT POWDER, BUIHACH, PYRETHRUM.

This valuable remedy has one drawback, its cost. It is too expensive for use on a large scale. It kills insects through their breathing pores, but is harmless to man and beast. It will kill many of the insects of the garden if dusted on or applied as a spray at the rate of one ounce to two gallons of water.

Use the powder when it is undesirable to use poison, but never buy any unless it comes in tightly sealed packages. It loses its strength on short exposure to the air. An hour will suffice to weaken it. It must be applied from time to time, as it quickly loses its strength.

TOBACCO.

Tobacco in the form of dust may be obtained of the large manufacturers for a few cents a pound.

It is useful in destroying root-lice, especially woolly-aphis, in young trees, and in keeping insects from garden truck. For root-aphis, incorporate four to six handfuls of tobacco dust into the soil about the roots and induce a thrifty, healthy growth by using liberal quantities of nitrate of soda or barnyard manure early in the spring.

A *strong* infusion or tea made of waste will kill plant lice if sprayed when they first appear.

Nicotine is to be had now in concentrated form. It is more often sold about 40 per cent strong. This may be diluted many hundreds of times before applying. As there is a diversity of grades and brands to be had, it will be well to use the strength recommended by the makers.

HYDRATED LIME.

Finely slaked lime is often useful because of its slight caustic properties. Against such larvae of saw-flies and beetles as are sticky, for instance, those of the cherry-slug and asparagus-beetle, it may be used as a substitute for poison, if the latter, for some reason is undesirable.

Stone lime may be slaked with a small amount of hot water, using just enough to turn it to a dry powder. Such slaked lime is as fine as flour and very soft to the touch, having very little grit. Use a metal pail or kettle to slake in, as the heat may set fire to wood. Do not use too much water, and where possible, use freshly burned lime.

Hydrated lime may be used in making Bordeaux mixture, but it is not as reliable as good, fresh, lump lime. It is less adhesive, not as strong (so more should be used) and more expensive. The one advantage is that it is a little easier to use.

Ground lime for making Bordeaux mixture acts exactly like lump lime, if fresh, but this is difficult to determine as it is already in a powder.

CAUTIONS.

Do not spray while plants are in bloom. It is prohibited by law, except when canker-worm is present, and may destroy bees and other beneficial insects.

Do not dissolve copper sulphate in an iron or tin vessel. It will ruin the vessel and spoil the spraying solution.

For all spraying solutions containing copper sulphate, the pump must be brass or porcelain lined.

Wash out pump and entire outfit each time after using.

Use arsenate of lead on stone fruits in preference to other forms of arsenical poisons. It is less liable to burn the foliage.

Do not spray fruits or plants with poison within a month or more of the time when they are to be picked.

Keep all "stock solutions" covered to prevent evaporation.

Do not spend money for freak "cure-alls," such as powders to be put into a hole bored in the trunk or limbs of trees or liquids to be diluted and poured on the ground beneath the trees. They may do considerable harm.

WHEN THE CODLING-MOTH FLIES.

While the first week in August is a good average time for applying an arsenical spray for the second generation of the codling-moth in Michigan, it is well to remember that seasons vary, and that the time set aims merely at an average. To determine exactly each year just when to get the highest efficiency out of a spray, for a particular locality, requires only a few hours of work, providing one can find some neglected apple trees near at hand.

First of all scrape off all loose bark-flakes from the trunk and limbs of several trees, thus destroying all the natural places for the hiding away of the cocoons. The scraping is most easily done while the bark is soft after a prolonged rain.

Next, make some bands of burlap six or eight inches broad and three or four layers thick; place one around the trunk of each prepared tree and fasten with a headless wire nail driven into the tree so that the band can easily be removed. Do this in June so that the cloth may become weathered before the time for spinning. The larvae in searching for a good place to spin cocoons will find the bands, in the absence of other protection, and spin cocoons there.

Occasionally examinations during July will reveal these cocoons which should be carefully removed by cutting out a small bit of the cloth to which each is fastened.

Place all these bits of cloth with the cocoons attached in a cage made of a lantern globe or some other glass cylinder open at top and bottom, and then tie a bit of mosquito netting over the top to confine the insects when they come out of the cocoons. If the lantern globe is set on a little soil in a flower pot and the soil is kept just slightly moist, the chances of getting the moths out are increased.

Now put the cage thus prepared in a shady place where the sun cannot strike it to sweat it, and where the rain cannot penetrate. Outside of protection from rain and sun the conditions should be as near those of the outside as possible. Keep the soil in the pot just moist and look for the moths often during late July for they will hide down under the layers of burlap and may be overlooked. When you see them in the cage, then you will know that they are laying eggs in the orchard and the time to spray is just before the young hatch and go into the fruit, which is about a week or ten days later, not afterward. Of course, they do not come out all together, but string along over quite a period.



W. B. Gray's cherry orchard in bloom. Peninsula township, Grand Traverse county.

TABLE OF DILUTIONS FOR CONCENTRATED LIME-SULPHUR WASH.

To spray for San Jose and other scale insects.		Summer Sprayings for Apples, Cherries, and European Plums.	
If Baume test is	Amount below should be diluted to 50 gallons.	If Baume test is	Amount below should be diluted to 50 gallons.
33	6 $\frac{1}{4}$ gallons	33, 32 or 31	1 $\frac{1}{4}$ gallons
32	6 $\frac{1}{2}$ gallons	30, 29 or 28	1 $\frac{1}{2}$ gallons
31	6 $\frac{3}{4}$ gallons	27, 26 or 25	1 $\frac{3}{4}$ gallons
30	7 gallons	24, 23 or 22	2 gallons
29	7 $\frac{1}{2}$ gallons	21, 20 or 19	2 $\frac{1}{4}$ gallons
28	7 $\frac{3}{4}$ gallons	Summer Spraying of Pears.	
27	8 $\frac{1}{4}$ gallons		
26	8 $\frac{3}{4}$ gallons		
25	9 gallons		
24	9 $\frac{1}{2}$ gallons		
23	9 $\frac{3}{4}$ gallons		
22	10 gallons		
21	10 $\frac{1}{2}$ gallons	33, 32 or 31	1 gallon
20	10 $\frac{3}{4}$ gallons	30, 29 or 28	1 $\frac{1}{4}$ gallons
19	11 $\frac{1}{4}$ gallons	27, 26 or 25	1 $\frac{1}{2}$ gallons
18	11 $\frac{1}{2}$ gallons	24, 23 or 22	1 $\frac{3}{4}$ gallons
17	12 gallons	21, 20 or 19	2 gallons

SECRETARIES OF STATE HORTICULTURAL SOCIETIES.

Arizona.....	R. H. Forbes, Tucson
Alabama.....	P. F. Williams, Auburn
Arkansas.....	Prof. Ernest Walker, Fayetteville
California.....	H. H. Lillienthal, San Francisco
Connecticut.....	H. C. C. Miles, Milford
Florida.....	E. O. Painter, Jacksonville
Georgia.....	J. B. Wright, Cairo
Illinois.....	W. B. Lloyd, Kinmundy
Indiana.....	C. G. Woodbury, Lafayette
Indiana.....	W. N. Yost, Meridian
Iowa.....	Wesley Greene, Davenport
Kansas.....	Walter Wellhouse, Topeka
Kentucky.....	W. R. Button, Bedford
Louisiana.....	F. H. Burnette, Baton Rouge
Maine.....	E. L. White, Bowdoinham
Maryland.....	Prof. C. P. Close, College Park
Massachusetts.....	William P. Rich, Boston
Michigan.....	Charles E. Bassett, Fennville
Minnesota.....	A. W. Latham, Minneapolis
Mississippi.....	H. E. Blakelee, Jackson
Missouri.....	Dr. W. L. Howard, Columbia
Montana.....	M. L. Dean, Missoula
Nebraska.....	C. G. Marshall, Lincoln
New Hampshire.....	B. S. Pickett, Durham
New Jersey.....	Howard G. Taylor, Riverton
New Mexico.....	J. D. Sena, Santa Fe
New York.....	E. C. Gillett, Penn Yan
.....	John Hall, Rochester
North Carolina.....	Prof. W. N. Hutt, West Raleigh
North Dakota.....	O. O. Churchill, Agri. College
Ohio.....	F. H. Ballou, Newark
Oklahoma.....	J. B. Thoburn, Oklahoma City
Oregon.....	Frank W. Power, Portland
Pennsylvania.....	Chester J. Tyson, Floradale
Rhode Island.....	Arthur C. Miller, Providence
South Dakota.....	Prof. N. E. Hansen, Brookings
Tennessee.....	Prof. Charles A. Keffer, Knoxville
Texas.....	Prof. E. J. Kyle, College Station
Utah.....	J. Edward Taylor, Salt Lake City
Vermont.....	M. B. Cummings, Burlington
Virginia.....	Walter Whately, Crozet
Washington.....	L. M. Brown, Walla Walla
West Virginia.....	A. L. Dacy, Morgantown
Wisconsin.....	F. Cranefield, Madison
Wyoming.....	Aven Nelson, Laramie

OBITUARY OF THOMAS WILDE.

Thomas Wilde, a life member of the State Horticultural Society died May 17, 1913. He was born on the Foxholds farm, Hyde, Cheshire, England, April 29, 1830. He came to the United States when he was twelve years of age, and went to East Hamburg, N. Y., where he learned the tanner's trade. In 1853 he married Cordelia Dietrich of Rush township, Monroe county N. Y. Two years later the young couple came to Michigan and settled in the then wilderness of the township of Wright, Ottawa county, where he had lived until his death. His wife died June 16, 1911. They raised a family of ten, of whom four sons and four daughters survive them. Mr. Wilde engaged in farming and made a specialty of small fruits, being a pioneer in that line. He was one of the first to experiment in cross fertilization of fruit plants, having obtained results before Burbank engaged in it. He was the originator of many good varieties of strawberries. The Flush strawberry, now quite extensively grown in California and other western states, was one of his seedlings. He was also interested in tree fruits and raised some of the finest in Ottawa county. He was a charter member of the Grand River Valley Horticultural Society and Ottawa Grange No. 30 and he has always been an active member of the Ottawa and West Kent Fair Association. The deceased was a progressive farmer and fruit grower and one of those sturdy pioneers, fast passing away, who helped to build up the state as one of the leading ones in agriculture and horticulture.

ANNUAL REPORTS
OF
LOCAL HORTICULTURAL SOCIETIES.

BERRIEN COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

George Friday,	-	-	-	-	-	-	-	-	-	President.
C. H. Hilton,	-	-	-	-	-	-	-	-	-	Vice-President.
C. A. Pratt,	-	-	-	-	-	-	-	-	-	Secretary.
J. M. Cunningham,	-	-	-	-	-	-	-	-	-	Treasurer.
Henry Ewald	}									Directors.
L. W. Ruth										
Miss E. McIsaac										

MEMBERS FOR 1912.

J. A. Stump, Sodus.
W. A. Rose, Benton Harbor.
J. F. Carter, Benton Harbor.
R. A. Smyth, Benton Harbor, R. 4.
Joe Peters, Benton Harbor, R. 2.
Jacob Friday, Coloma.
Geo. Friday, Coloma.
Will Renner, Benton Harbor, R. 3.
Henry Leel, St. Joseph.
W. M. Wissing, St. Joseph.
C. H. Hilton, Benton Harbor.
C. E. Hilton, Benton Harbor.
William Geisler, St. Joseph.
G. S. Drake, Benton Harbor.
Henry E. Ewald, Benton Harbor.
L. T. Burrige, Benton Harbor.
H. H. Hogue, Sodus.
Hale Tennant, Sodus.
S. McCord, Benton Harbor.
Henry Pump, Benton Harbor.
Murphy Bro., St. Joseph.
J. H. Chamberlain, Benton Harbor.
E. McIsaac, Benton Harbor.
I. McIsaac, Benton Harbor.
F. J. Ewald, Benton Harbor.
J. M. Cunningham, Benton Harbor.
J. W. Reed, Benton Harbor.
R. O. Woodruff, Benton Harbor.
S. Hull, Benton Harbor.
B. J. Eaman, Benton Harbor.
E. H. Peters, Benton Harbor.
John Mass, Benton Harbor.
C. C. Kneibes, Watervliet.
W. B. Mosher, Berrien Center.
Geo. Fritz, St. Joseph.
J. P. Versaw, Sodus.
Reinholt Wendel, Coloma.
John O'Brien, Benton Harbor.

T. N. Perry, Coloma.
Henry Pollard, Coloma.
G. W. Loorner, Benton Harbor.
Ralph Ballard, Niles, R. 4.
Young Bro., Niles, R. 4.
Exilda Camfield, Benton Harbor.
A. B. Bishop, Coloma.
Aug. Schneider, Benton Harbor.
J. G. Wright, Benton Harbor.
Fred Hobbs, Benton Harbor.
B. Bartram, Benton Harbor.
C. H. Mitchel, Benton Harbor.
Geo. L. Port, Coloma.
Fred Bishop, Hartford.
Arthur Dickinson, Benton Harbor.
W. W. Knapp, Watervliet.
Dr. L. Ringh, Benton Harbor.
Chas. Renolds, Benton Harbor.
James Bishop, Benton Harbor.
Juan Hess, Benton Harbor.
Gaylord Trisbee, Benton Harbor.
W. H. Swarthout, Coloma.
Ed. Dukesherer, Coloma.
Albert Beaton, Benton Harbor.
Willard R. Mayes, Benton Harbor.
John Heior, Benton Harbor.
Philip Young, Benton Harbor.
R. P. Streets, Benton Harbor.
R. L. Hayes, Benton Harbor.
Earnest E. Lewis, Benton Harbor.
John P. Kniebus, Coloma.
W. C. Cribbs, Watervliet.
Philip Hosbein, Coloma.
C. Beckwith, Coloma.
Will Terwilliger, Benton Harbor.
C. E. Stuart, Benton Harbor.
B. D. Bishop, Benton Harbor.

SAUGATUCK AND GANGES POMOLOGICAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Edward Hutchins, Fennville, R. F. D. 1,	-	-	-	-	-	-	President.
Charles B. Welch, Fennville, R. F. D. 2,	-	-	-	-	-	-	Secretary.
Horace G. Welch, Fennville, R. F. D. 2,	-	-	-	-	-	-	Treasurer.
Charles E. Bassett	}	-	-	-	-	-	Vice-Presidents.
H. H. Goodrich		-	-	-	-	-	
E. H. House		-	-	-	-	-	

MEMBERS.

Hutchins, Edward, Fennville, R. 1.	Wedge, J. D., Allegan, R. 4.
Wiley, D. W., Douglas.	Plummer, L. E., Fennville, No. 1.
Dunn, Wm. H., Ganges.	Weed, P. P., Fennville, R. 2.
Atwater, E. H., Ganges.	House, E. H., East Saugatuck, R. 1.
Davis, Chas., Fennville, R.	Wark, Edward, Fennville, R. 2.
Plummer, Wm. H., Fennville.	Eubank, O. V., Fennville, R. 1.
Goodrich, H. H. Ganges.	Cleffy, James, Fennville, R. 1.
Gooding, T. L., Fennville, R. 1.	Birkholz, Chas., Fennville, R. 2.
Gaze, Geo. C., Fennville, R. 3.	Hayes, John R., Fennville, R. 2.
Leland, E. P., Fennville, R. 1.	Heinze, Emil, Fennville, R. 2.
Rickert, W. C., Douglas.	Miller, Jesse L., Bravo, R. 2.
Taylor, Grace L., Fennville, R. 2.	Stevens, A. H., Bravo, R. 2.
Fabun, J. C., Bravo, R. 2.	Schringer, David, Bravo, R. 2.
Paquin, N., Bravo, R. 2.	Symons, Chas., Bravo, R. 2.
Wedge, J. D., Allegan, R. 4.	Dorning, J. F., Bravo, R. 2.
Broe, P. H., Fennville, R. 3.	Dailey, Chran, Bravo, R. 2.
Herbert, Fred, Douglas.	Repp, Lewis, Bravo, R. 2.
Tillinghast, Clark, Douglas.	Wells, Henry, Bravo, R. 2.
LaDick, Wm., Fennville, R. 1.	Wright, Perry, Bravo, R. 2.
Funk, J. M., Bravo, R. 2.	Berry, John, Glenn.
Chapman, J. G., Fennville, R. 1.	Williamson, C. P., Bravo, R. 2.
Thompson, A. Saugatuck.	Hamlin, W. M., South Haven, R. 2.
Kenter, Vern, Fennville, R. 1.	Wolfgang, L. C., Bravo, R. 2.
Kingsbury, E. E., Fennville, R. 1.	Wadsworth, Jas., Fennville.
Rouse, W. E., Fennville, R. 1.	Stillson, W. B., Fennville, R. 1.
Kerr, Wm., Douglas.	Howland, David, Fennville, R. 2.
Plummer, F. W., Fennville, R. 1.	Hoover, A., Fennville, R. 1.
Kitchen, M. W., Fennville, R. 1.	Munger, R. C., South Haven, R. 2.
Cawthorp, F. S., Bravo, R. 2.	Weed, Mrs. Will, Fennville, R. 2.
Dreher, Adolph, Fennville, R. 2.	James, Harvey, Bravo, R. 2.
Turrell, W. J., Fennville.	Hilbert, Henry, South Haven, R. 2.
Kibby, W. J., Fennville, R. 2.	Smith, C. S., South Haven, R. 2.
Knox, A. R., Fennville, R. 1.	Fabun, J. C., Bravo, R. 2.
Kingsbury, A. O., Fennville, R. 3.	Conrad, S. L., Bravo, R. 2.
Hirner, John, Fennville, R. 2.	Dean, G. D., Fennville, R. 1.
Mosier, Frank, Fennville, R. 3.	Armstrong, W. H., South Haven, R. 2.



B. J. Morgan apple orchard in Lelanau county.

OAKLAND COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Charles A. Bingham, Birmingham,	-	-	-	-	-	-	-	President.
W. D. Flint, Novi,	-	-	-	-	-	-	-	Vice-President.
Sarah E. Sly, Birmingham,	-	-	-	-	-	-	-	Secretary.
Charles B. Pettibone, Farmington,	-	-	-	-	-	-	-	Treasurer.
R. J. Coryell, Birmingham,	-	-	-	-	-	-	-	Prompter.
A. L. Ross, Rochester								
Harry McCracken, Farmington	}	-	-	-	-	-	-	Executive Committee.
James N. Cobb, Birmingham								
H. J. Broughton, Birmingham								

MEMBERS.

J. F. Deacon, 28 Connecticut Ave., De-	Arthur H. Shultz, Pontiac, R. 7.
troit, Mich.	E. Foster, Clarkston.
C. W. Haven, Royal Oak, R. 2.	Caleb Jackson, Birmingham.
E. J. Ver Duyn, Novi, R. 1.	F. B. Howlett, Pontiac.
F. P. German, Birmingham, R. 2.	Thomas R. Beddow, Birmingham, R. 1.
A. H. Beebe, Birmingham, R. 2.	Frank Tanner, Pontiac.
Stanley, Case, Franklin.	Homer Cummings, Pontiac, R. 5.
L. B. Flint, Novi.	James H. Cutcheon, Orion, city address
Carl Tibbits, Farmington, R. 3.	Detroit Beef Co., Detroit, Mich.
Charles Bingham, Birmingham, R. 2.	George Bingham, Birmingham, R. 2.
H. J. Broughton, Birmingham, R. 2.	W. R. Marvin, Pontiac.
W. J. Spicer, Birmingham, R. 2.	Howard Masters, Birmingham, R. 5.
R. J. Coryell, Birmingham, R. 2.	Walter A. Carpenter, Troy.
W. D. Flint, Novi.	Ernest E. Green, Orchard Lake.
J. A. Graley, Pontiac, R. 6.	Visgar Spicer, Birmingham, R. 1.
John Kleine, Birmingham, R. 2.	Floyd Leach, Birmingham, R. 2.
Volney Miller, Birmingham, R. 1.	Edwin Leach, Birmingham.
Miss Sarah E. Sly, Birmingham, R. 2.	William A. Bassett, Birmingham, R. 5.
Miss Addie Sly, Birmingham.	Sidney Colby, Birmingham, R. 2.
Edwin Miller, Birmingham, R. 2.	Charles Knowles, Pontiac, R. 3.
Thomas H. Thurber, Birmingham, R. 2.	L. L. Seeley, Pontiac, R. 3.
Albert Sloo, Birmingham, R. 2.	Edward Colby, Birmingham, R. 2.
R. D. Bird, Birmingham, R. 2.	Casper Case, Birmingham.
A. C. McGraw, Birmingham.	Jackson Voorheis, Davisburg, R. 1.
J. T. Miller, Birmingham, R. 2.	Bert Foreman, Birmingham, R. 2.
R. J. Beattie, Birmingham, R. 2.	Albert Bradway, Birmingham.
William Storey, Birmingham, Briar Bank	Clarence Higby, Birmingham, R. 2.
Farm.	Louis Steinkopf, Pontiac, R. 5.
James W. Cobb, Birmingham.	William Benedict, Orchard Lake, R. 1
S. H. Tyrer, Pontiac.	(Box 81).
C. L. Rockweed, 180 Franklin Ave.,	George Stoll, Birmingham, R. 1.
Pontiac.	Ezra Chamberlain, Orion, R. 3.
Morris M. Jay, Pontiac, R. 5.	Alvin Leach, Birmingham, R. 2.
Elmer Evans, Birmingham, R. 2.	B. D. Wood, Birmingham, R. 2.
Ward Eagle, Farmington, R. 1.	Chas. Johnston, Franklin.
Raymond H. Hyde, Farmington, R. 3.	A. H. Whitmer, Birmingham, R. 2.
H. W. Green, Orchard Lake, R. 1.	G. A. Cottrell, Milford, R. 5.
J. W. Strong, Pontiac, R. 3.	Arch Stoddard, Leonard.
S. E. McKinney, Birmingham.	Andrew Bowden, Franklin.
Charles Pettibone, Farmington.	O. L. Murray, Walled Lake.
William A. Harmon, Pontiac.	Arthur Snook, Rochester.
Bert G. Beebe, Holly.	A. J. Tibbits, Farmington. (Died Nov.,
Jacob Perry, Goodison.	1912.)
H. C. Gatzka, Birmingham, R. 2.	John Landow, Farmington.

H. N. McCracken, Farmington.
 Edwin H. Seeley, Novi.
 H. C. Bartlett, Farmington.
 Carl Hatten, Farmington.
 Fred Bade, Farmington.
 J. B. Halstead, Farmington.
 Frank N. Steele, Farmington.
 E. S. Sprague, Farmington.
 L. B. Robb, M. D., Leonard.
 Otto A. Park, Birmingham.
 Mrs. Henry C. Ward, Pontiac.
 Harrison Walter, Clarkston.
 Almon Parks, Birmingham.
 E. S. Letts, Rochester.
 G. S. Brodie, Pontiac.
 L. N. Howard, Farmington.
 S. G. Foreman, Birmingham.
 H. E. Moore, Orchard Lake.
 Mrs. S. H. Tyrer, Pontiac.
 Peter Voorheis, Pontiac.
 H. J. Ross, Rochester.

Bert Tyack, Troy.
 Henry C. Ward, Pontiac.
 A. Scott, Pontiac.
 E. E. Sweet, Birmingham.
 A. L. Ross, Rochester.
 Jackson, Voorheis, Davisburg.
 W. J. Bailey, Troy.
 Walter German, Birmingham.
 W. A. Newman, Pontiac.
 Duane Tibbitts, Farmington.
 Orlando J. Munro, Novi.
 Henry M. Leland, Detroit.
 L. R. Hunter, New Hudson.
 Mrs. L. R. Hunter, New Hudson.
 A. E. Fleckinger, Rochester.
 Z. H. Curtis, Leonard.
 J. C. Chamberlin, Leonard.
 W. W. Graham, Rochester.
 P. J. Meiser, Detroit.
 C. G. Ladd, Rochester.

The Oakland County Horticultural Society closes its first year with a membership of 123.

Seven meetings have been held at the following places with prominent speakers:

Birmingham and Pontiac, Organization Meetings, with Mr. T. A. Farrand, President of State Horticultural Society as speaker.

Birmingham, Mr. C. E. Bassett, Secretary of State Horticultural Society, as speaker.

Farmington, (Union Meeting with Farmington Dairymens Association), with Rev. George E. Gullen, Farmington; Mr. N. A. Clapp, Northville, a Member of the State Detroit Board of Health; Mr. H. N. McCracken, Farmington, as speakers.

Sly Farms, Birmingham, Prof. L. R. Taft, Agricultural College, as speaker.

Mr. J. A. Graley's, near Pontiac, with Prof. L. R. Taft, as speaker.

Mrs. H. C. Ward's, Square Lake.

Mr. L. B. Flint's, Novi, Mr. O. K. White, Field Agent in Horticulture, Agricultural College, as speaker.

Mr. A. L. Ross, Rochester, with Mr. R. J. Coryell, as speaker.

The meetings have been very instructive and of great benefit to horticulturists.

The first exhibit at the State Fair, under the auspices of the Society, was a creditable showing of apples for the county. Great credit is due the Chairman, R. J. Coryell, for his efforts in securing the display of fruit. Fourth prize was awarded.

MANISTEE COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

The Manistee County Horticultural Society, auxiliary of the Michigan State Horticultural Society, was organized at Bear Lake, January 26, 1912.

OFFICERS.

President—Edwin S. Russell,	-	-	-	-	-	-	-	Manistee.
Vice-President—Arlie L. Hopkins,	-	-	-	-	-	-	-	Bear Lake.
Secretary—Jos. F. Brunais,	-	-	-	-	-	-	-	Chief.
Treasurer—Wm. F. Milarch,	-	-	-	-	-	-	-	Bear Lake.

MEMBERS.

Geo. Crook, Bear Lake.	L. S. Ramsdell, Manistee.
Bert Bowling, Bear Lake.	R. R. Ramsdell, Manistee.
Arch Marshall, Bear Lake.	James A. King, Manistee.
Archie Graham, Bear Lake.	Magnus Nelson, Manistee.
Stanley Mallison, Bear Lake.	C. B. Jentoft, Manistee.
Ed. Oleson, Bear Lake.	H. C. Bright, Manistee.
Louis Lingg, Bear Lake.	Harlan MacMullen, Manistee.
Bruce McIntosh, Bear Lake.	H. W. Marsh, Manistee.
H. M. Jones, Chief.	Lawrence Marsh, Manistee.
Mrs. H. M. Jones, Chief.	Thomas W. Ferguson, Manistee.
Mrs. Mary Burmeister, Onkama.	Herbert L. Harley, Manistee.
Geo. Appleton, Bear Lake.	Dudley A. Siddal, Manistee.
Mrs. Nellie Vector, Bear Lake.	B. R. Hindel, Manistee.
Miss Mable Richmond, Bear Lake.	C. H. Morey, Manistee.
K. M. Jones, Bear Lake.	J. M. Peterson, Manistee.
Fred Bradford, Bear Lake.	T. J. Ramsdell, Manistee.
Geo. Kuenzer, Bear Lake.	F. A. Mitchell, Manistee.
J. C. Merritt, Manistee.	A. E. Moen, Chief.
S. L. Smith, Bear Lake.	O. C. Moen, Chief.
C. J. Milarch, Bear Lake.	John Cushing, Bear Lake.
Matthew Lutz, Chief.	Geo. W. Holler, Bear Lake.
Tom Quinlan, Arcadia.	Fred Baird, Arcadia.
F. E. Brunais, Chief.	Carl Pickert, Arcadia.
Fred Herrmann, Chief.	Charley Starke, Arcadia.
J. E. Cody, Bear Lake.	Henry Montler, Arcadia.
Richard Graham, Bear Lake.	John Bradford, Arcadia.
L. D. Connelly, Bear Lake.	D. J. Martineau, Arcadia.
Joseph Patterson, Chief.	Carl Bigge, Arcadia.
P. C. Chamberland, Arcadia.	Chas. P. Matteson, Arcadia.
J. C. Strickler, Bear Lake.	Wm. D. Ebert, Arcadia.
Jas. H. Millard, Bear Lake.	H. J. Lang, Arcadia.
C. N. Russell, Manistee.	Adolph Hasse, Arcadia.
H. M. Cosier, Bear Lake.	Jackson & Oppenheim, Arcadia.
Mrs. Geo. Cole, Bear Lake.	Edwards Bros., Arcadia.
Donald Crouch, Onkama.	Shira Bros., Arcadia.
N. C. Bertelson, Bear Lake.	Mary E. Carr, East Lake.
Peter H. Lass, Bear Lake.	Walter L. Dietz, Onkama.
L. A. Herkelrath, Pierport.	E. F. Marr, Bear Lake.
E. O. Thompson, Bear Lake.	Mrs. Jane Probert, Bear Lake.
Chris Shively, Chief.	Fred Smith, Arcadia.
Roy Welch, Bear Lake.	Walter Kebaugh, Arcadia.
Jim McGuire, Bear Lake.	H. C. Fox, Bear Lake.
R. W. Smith, Manistee.	Lumen Garven, Bear Lake.
Geo. A. Hart, Manistee.	A. J. L. Keddie, Bear Lake.
T. J. Elton, Manistee.	Joseph Floersch, 7444 Normal Ave.,
James Mullen, Manistee.	Chicago.

Our Horticultural Society was organized at Bear Lake, January 26, 1912.

The first meeting was held at Bear Lake, March 6, and devoted mostly to business affairs.

The second meeting was held April 9, at the same place. The program was in charge of local fruit growers. J. E. Merritt and Wm. Milarch spoke on the planting of young orchards. Most everything pertaining to planting of fruit trees was discussed.

A. L. Hopkins gave an interesting talk on spraying, warning fruit growers to be sure to spray on time. He also showed several different styles of nozzles and sprayer fixtures, telling which was most satisfactory.

The meeting in May was held in Geo. W. Hopkins and Sons orchards at Bear Lake. Mr. O. K. White, of M. A. C. was present and gave demonstrations in pruning and spraying.

June 21st a meeting was held at Onekama. Professor Eustace spoke on the management and cultivation of orchards, use of fillers and cover crops, girdling of trees to produce fruit when young, etc. Professor Patten spoke on fertility of soils, fertilization and liming. That these are subjects of interest to the farmers of Manistee county was proven by the interest displayed and questions asked.

There was a large attendance at the meeting at Bear Lake, August 19. Wm. C. Smith of Delphi, Indiana, author of "How to grow 100 bushels of corn per acre on worn out soil," gave an interesting talk on the restoration of worn out soil by the use of cover crops and green manuring. Mr. Smith claims that he can build up any soil in the country by plowing under rye and winter vetch.

E. H. Dow, President of the Dow Chemical Works, told of his first experience at truck farming on three acres of poor, sandy soil and some of the things he learned thereby. He also gave his method of planting trees.

Professor Hedrick of the New York Experiment Station gave the results of some experiments in pruning and fertilization conducted at the station.

There were no regular meetings held in September and October but Mr. White gave a demonstration in grading and packing apples, before members of the society in October.

SUTTONS BAY FRUIT GROWERS' ASSOCIATION.

(Auxiliary to the State Society.)

OFFICERS FOR 1913.

Albert F. Freeland,	-	-	-	-	-	-	-	-	-	-	-	President.
Theodore Asch,	-	-	-	-	-	-	-	-	-	-	-	Vice-President.
Claus Van Glahn,	-	-	-	-	-	-	-	-	-	-	-	Treasurer.
W. M. Payne, M. D.,	-	-	-	-	-	-	-	-	-	-	-	Secretary.

MEMBERS.

Chas. Krupt, Maple City, R. F. D.
 Albert Freeland, Omena.
 Philip Ejeler, Suttons Bay.
 Geo. Smeltzer, Suttons Bay.
 Dunkelton Bros., Suttons Bay.
 Wm. Crocker, Suttons Bay.
 John Bremer, Suttons Bay.
 Fred Otto, Suttons Bay.
 Louis Sill, Suttons Bay.
 Anna Reynolds, Suttons Bay.
 Ole Larson, Suttons Bay.
 John Weisler, Suttons Bay.
 Al. Smith, Suttons Bay.
 Nels Aleson, Suttons Bay.
 Henry Kahrs Sr., Suttons Bay.
 Philip H. Portner, Suttons Bay.
 Wm. Horn, Suttons Bay.
 Theo. Asch, Suttons Bay.
 Morgan Steele, Suttons Bay.
 John Wald, Suttons Bay.

Mat Spinniken, Suttons Bay.
 Henry Kahrs, Jr., Suttons Bay.
 Wm. Van Glahn, Suttons Bay.
 Adolph Echerle, Suttons Bay.
 Claus Van Glahn, Suttons Bay.
 L. E. Bahle, Suttons Bay.
 Fred Revolt, Suttons Bay.
 Con Lather, Suttons Bay.
 Geo. Steffens, Suttons Bay.
 Albert Hanson, Suttons Bay.
 Marcus Hoyt, Suttons Bay.
 Enor Christianson, Suttons Bay.
 J. J. Maakestad, Suttons Bay.
 John Smiseth, Suttons Bay.
 Philip J. Portner, Suttons Bay.
 Henry Kelsch, Suttons Bay.
 Frank Werler, Suttons Bay.
 William Reineke, Suttons Bay.
 Jacob Esch, Suttons Bay.

Prof. O. K. White, of Lansing, has been with us on three occasions, giving demonstrations on pruning and spraying, following in a short time with one on thinning. At our Agricultural Fair was held by him a demonstration on packing and grading of all fruits. All of which were highly appreciated and for which we extend to Prof. O. K. White and the State Association our hearty thanks.

W. M. PAYNE, M. D., Secretary.

KALAMAZOO COUNTY FRUIT GROWERS' SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

[illegible]

After the close of the past year, with much open weather and a large part of our crops in storage to dispose of we have not given the Society time or thought. We have only had three meetings but have arranged for several in the near future. This accounts for our small membership at present but I am sure we will have more in the near future. Members are as follows:

Harry Middleton, Kalamazoo, 204 N. Rose St.	E. R. Jackson, Plainwell.
E. F. Stoddard, Kalamazoo, R. 12.	G. A. Cavanaugh, Kalamazoo, R. 10.
H. L. Jacobson, Kalamazoo, R. 3.	Charles Scudder, Augusta.
E. V. Kendall, Oshtemo.	A. J. Shakesphere, Kalamazoo, R. 5.
Fred Meyers, Alamo, R. 13.	Miss E. C. Reynolds, 709 West Cedar St., Kalamazoo.
C. W. Thompson, 530 Wheaton Ave., Kalamazoo.	Wm. Healy, Bloomingdale.
Herman Wunderlin, 815 Stockbridge Ave., Kalamazoo.	W. H. Dennis, Kalamazoo, R. 5.
J. S. Oswald, Doster, Barry Co.	G. H. Seiler, Kalamazoo, R. 10.
	Geo. M. Chaenels, Alamo, R. 13.

Seventeen in all. I hope to have more in the near future. We are interested in the market conditions of our fruit, with strong talk of a cooperative system as outlined by our State Secretary, Mr. C. E. Bassett, who spoke to us on the first of March. We heartily agree with Mr. Bassett on the proposition. The consumer and producer must get in closer touch with each other. We also recommend honest measure with an honest pack label for advertisement and protection. We also recommend larger acreage, which will strengthen our organization and reduce the cost.

SOUTH HAVEN AND CASCO POMOLOGICAL SOCIETY.

(Organized 1871.)

OFFICERS FOR 1913.

[illegible]

MEMBERS.

C. E. Abell, Phoenix St., South Haven.
 R. H. Adkins, 627 Huron St., S. Haven.
 Alfing B. Alfing, S. Haven, R. 6.
 Robert Anderson, Covert.
 M. H. Bixby, 752 Wilson St., S. Haven.
 T. A. Bixby, R. 2.
 Ernest Burnham, Western Normal, Kalamazoo.
 Geo. E. Chatfield, S. Haven, R. 4.
 Leonard Chambers, S. Haven, R. 5.
 C. C. Chesebro, S. Haven, R. 3.
 A. B. Coit, 829 Phillips St., S. Haven.
 Henry Crabtree, 103 Main St., S. Haven.
 R. F. Dean, S. Haven, R. 3.
 Abel DeRocher, Berlamont.
 C. E. Fowler, R. 6.
 M. T. French, 320 Pearl St., S. Haven.
 H. P. Fullenwider, 853 Phoenix St., S. Haven.
 T. H. Frost, S. Haven.
 R. E. Gibson, Phoenix St., S. Haven.
 A. G. Goodridge, R. 2.
 W. F. Grady, S. Haven, R. 1.
 B. G. Green, S. Haven, R. 4.
 F. A. Gregory, S. Haven, R. 2.
 Geo. W. Griffin, S. Haven, R. 2.
 Willis Hallock, 205 Michigan Ave., S. Haven.
 E. A. Hartman, S. Haven.
 H. C. Heald, S. Haven, R. 3.
 Earl Hemenway, 203 Center St., S. Haven.
 A. R. Herriman, 200 Center St., S. Haven.
 S. F. Hill, 223 Huron St., S. Haven.
 D. E. Histed, S. Haven, R. 2.
 G. R. Hobbs, Bangor, R. 1.
 Jas. Hosking, Jr., S. Haven, R. 1.
 A. C. Hult, S. Haven, R. 2.
 J. C. Hunt, S. Haven, R. 1.
 J. C. Johnston, Kibbie, R. 2.
 John Jutkins, Grand Junction.
 E. L. Keasey, S. Haven, R. 1.

Martin C. Kehoe, S. Haven, R. 1.
 Jos. L. Kelley, R. 3.
 C. D. Leisnring, S. Haven, R. 3.
 Marshall Mackey, Phoenix St., S. Haven.
 H. E. Merritt, S. Haven, R. 2.
 C. S. Mills, S. Haven, R. 2.
 C. J. Moberg, S. Haven, R. 2.
 A. H. Monroe, Pearl St., S. Haven.
 C. J. Monroe, S. Haven.
 A. D. Moore, Phoenix St., S. Haven.
 John M. Mott, 405 Erie St., S. Haven.
 Geo. H. Myhan, 203 Dyckman Ave., S. Haven.
 A. F. Nagler, 351 Indiana Ave., S. Haven.
 John G. Nagler, S. Haven, R. 5.
 Jas. Nicol, S. Haven, R. 2.
 D. Ogden, S. Haven, R. 2.
 F. W. Osborn, S. Haven.
 Chas. Ott, S. Haven, R. 5.
 A. W. Overhiser, Kibbie, R. 2.
 F. J. Overton, Bangor, R. 1.
 J. Pedrick, S. Haven.
 Harry A. Randall, 199 Conger St., S. Haven.
 L. Schwaberow, S. Haven, R. 4.
 M. V. Selkirk, Phoenix St., S. Haven.
 E. E. Shaw, Grand Junction.
 H. L. Sherman, R. 6.
 Ralph P. Sherman, S. Haven, R. 6.
 Geo. R. Smith, S. Haven, R. 5.
 Wm. Smith, Phillips St., S. Haven.
 A. G. Spencer, Kibbie, R. 2.
 John Stout, R. 3.
 J. S. Templeton, 924 Postal Tel. Bldg., Chicago.
 Amos Tucker, Center St., S. Haven.
 F. E. Warner, S. Haven.
 Peter Watkins, S. Haven, R. 3.
 Robt. Watt, 832 Phillips St. S. Haven.
 Cecil Wilcox, S. Haven, R. 1.
 F. A. Wilken, 802 St. Joseph St., S. Haven.

LENAWEE COUNTY HORTICULTURAL SOCIETY.

Cicero S. Kendricks, Blissfield,	-	-	-	-	-	-	-	-	-	President.
N. D. Chew, Adrian,	-	-	-	-	-	-	-	-	-	Vice-President.
E. W. Allis, Adrian,	-	-	-	-	-	-	-	-	-	Secretary and Librarian.
H. C. Bradish, Adrian	-	-	-	-	-	-	-	-	-	Treasurer.
S. W. Bennett										
Adelbert Ward										
Dr. J. E. Westgate										
Helen Nickerson	-	-	-	-	-	-	-	-	-	Executive Committee.
Mrs. Carnahan										
Mrs. Kendrick										

Meetings held at Horticultural Hall, Court House, Second Wednesday of each month.

MEMBERS.

E. W. Allis, Adrian.	C. S. Kendrick, Blissfield.
S. W. Bennett, Adrian.	Mrs. C. S. Kendrick, Blissfield.
Mrs. S. W. Bennett, Adrian.	Mrs. Chas. Kimball.
H. C. Bradish, Adrian.	D. W. Love, Adrian.
Mrs. H. C. Bradish, Adrian.	Mrs. D. W. Love, Adrian.
Mrs. Frank Carnahan.	B. F. Mattern, Adrian.
N. D. Chew, Adrian.	Mrs. B. F. Mattern, Adrian.
Mrs. N. D. Chew, Adrian.	Mrs. Julia McFettridge, Adrian.
Hon. M. T. Cole, Adrian. (Died)	Miss Anna Meyer, Adrian.
H. L. Cole, Adrian.	Hon. W. H. Moore, Palmyra.
W. H. Cornelius, Adrian.	Mrs. W. H. Moore, Palmyra.
Mrs. Philomena Crane, Adrian.	Helen Nickerson, Adrian.
Mrs. Lucy Davis, Adrian.	Jeanette Nickerson, Adrian.
Alfred Edwards, Adrian.	Byron E. Niles, Blissfield.
Mrs. Alfred Edwards, Adrian.	W. G. Porter, Sand Creek.
Mrs. Harry Fee, Adrian.	Mrs. W. G. Porter, Sand Creek.
Mrs. Mary Gleason, Adrian.	Mrs. E. W. Reeder, Adrian.
Ben Gurin, Adrian.	Mrs. A. C. Taylor, Adrian.
Mrs. Wm. Gurin, Adrian.	Mrs. A. J. Walters, Adrian.
Rev. Samuel Heininger, Adrian.	Adelbert Ward, Adrian.
Mrs. S. Heininger, Adrian.	Dr. J. E. Westgate, Adrian.
Mrs. R. A. Hood, Adrian.	Mrs. Westgate, Adrian.
Mrs. Mary A. Howard, Adrian.	A. S. White, Adrian.
James H. Kelley, Adrian.	Mrs. Martha Willbee, Adrian.
Mrs. J. H. Kelley, Adrian. (Died)	Mrs. L. L. Wray, Adrian.

Hoping this may not be too late to be of service, I remain,

Very respectfully,
E. W. ALLIS, Secretary,
Adrian, Michigan.

JACKSON COUNTY FRUIT GROWERS' ASSOCIATION.

OFFICERS.

S. E. St. John,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	President.
W. L. C. Reid,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Secretary.

MEMBERS.

L. H. Field, Jackson.	Burt C. Hicks, Jackson, R. 4.
W. B. Field, Jackson.	W. D. Soper, Jackson.
M. Gilbert, Jackson.	Clyde Kilpatrick, Jackson, R. 3.
Jos. Butler, Jackson, R. 5.	C. J. Reed, Spring Arbor.
John W. Boardman, Jackson.	Harr Bros., Jackson, R. 2.
W. L. C. Reid, Jackson.	R. A. Lee, Jackson, R. 6.
S. E. St. John, Jackson, R. 2.	W. E. Kennedy, Jackson.
M. L. Noon, Grass Lake, R. 3.	W. N. Curtis, Rives Jet., R. 1:
J. E. McQuillen, Jackson, R. 4.	Fred Graves, Rives, R. 1.
Roy Heath, Jackson, R. 4.	Geo. Stiles, Rives.
W. B. St. Johns, Jackson, R. 2.	H. F. Wing, Grass Lake.
Jay Laverty, Jackson, R. 5.	W. O. Maxson, Grass Lake.
Geo. Shuart, Jackson, R. 2.	B. R. Harrington, Munith.
Ned Beebe, Jackson, R. 9.	Ray Borner, Albion.
C. A. Bullard & Son, Jackson.	L. B. Benton, Napoleon.
M. L. Abby, Jackson, R. 4.	Wm. N. Ottney, Jackson, R. 4.
B. A. Simonds, Jackson, R. 5.	R. D. Simmons, Jackson, R. 2.
I. A. Thayer, Jackson.	Milton French, Jackson, R. 3.
Vern Snyder, Jackson, R. 8.	John G. Noon, Grass Lake, R. 3.
S. B. Davis, Jackson.	J. Geo. Friedrichs Brooklyn, R. 3.
Frank Thompson, Jackson.	Enoch Bancker, Jackson.
H. G. Bailey, Jackson, R. 5.	C. F. Hutchins, care M. C. R. R., Homer.
H. W. Maguire, Mason.	Wm. Newman, Jackson.
C. E. Shotwell, Jackson.	Floyd C. Palmer, Jackson, R. 3.
B. C. Cole, Jackson, R. 9.	L. L. Wheeler, Parma.
Norton Bros., 326 Losey St., Jackson.	A. E. Ellisthorpe, Jackson, R. 7.
S. Schemahorn, Jackson, R. 7.	Dr. C. G. Parnell, Jackson.
E. L. Farrand, Jackson.	Mrs. L. A. Cooley, Jackson, R. 7.
J. E. Blake, Jackson, R. 2.	Wm. S. Cobb, Jackson.
C. W. Krooze, Jackson.	Willard C. Weeks, Napoleon.
J. E. Boey, Jackson, R. 5.	B. F. Lair, Jackson, R. 5.
H. J. Wilbur, Springport.	C. A. Barnes, Jackson.
E. T. Webb, Jackson.	Chas. H. Allen, Jackson.
H. B. Snow, Parma, R. 1.	W. J. O'Dwyer, Jackson.
Roy Brown, Jackson, R. 5.	O. S. Ludlow, Parma.
J. and C. Waltz, Jackson, R. 3.	C. W. Flansburg & Son, Jackson, R. 7.
Henry England, Jackson, R. 9.	Allen Bros., Jackson, R. 3.
H. C. Wollfe & Co., Spring Arbor.	L. E. Landon, Springport.
B. J. Nichols, 207 Merriman St., Jackson.	L. Whitney Watkins, Manchester.
John B. Ford, Jackson, R. 7.	J. W. Dart, Spring Arbor.
Glasgow Bros., Jackson.	E. C. Baker & Son, Jackson, R. 2.
Jos. Johnson, Jackson, R. 5.	J. P. Townsend, 811 Wildwood Ave., Jackson.
Carl Johnson, Jackson, R. 6.	F. C. Burdick, Rives Jet., R. 3.
C. W. Bond, Jackson, R. 4.	C. E. Strong, Somerset Center.
D. B. Hatton, Rives Jet., R.	Walter L. Ford, Brooklyn.
Hadley Bros., Parma.	David Walker, Brooklyn.
H. G. Marvin, Jackson.	Jos. North, Brooklyn.
Chas. Huntoon, Jackson, R. 5.	W. E. Eckerson, Rives Jet., R. 3.
James Davey, Jackson.	J. H. Gaunt, Jackson.
E. Bromley, Onondaga, R. 2.	H. C. Richardson, Jackson, R. 1.
E. B. Davidson, Cement City.	Dr. W. W. Lathrop, Jackson.
Chris Siegrist, Rives Jet., R. 3.	A. N. Sova, Jackson, R. 9.
Jacob Cooley, Jackson, R. 7.	P. Fisher, Rives Jet., R. 2.
Amos Rhoades, Jackson, R. 1.	

W. Abby, Rives Jet., R. 2.
C. W. McCoy, 296 Wildwood Ave., Jackson.
D. E. Turner & Son, Mosherville.
W. H. Cordon, Jackson.
Jos. Lutz, Grass Lake, R. 2.
C. J. Hankerd, Munith, R. 1.
G. Ray Reed, Clark's Lake, R. 2.
Dr. W. E. Spicer, Jackson.
D. S. Fleming, Jackson.

W. W. Fisk, Jackson.
Walter E. Sharp, Onondaga, R. 2.
Albert J. Walker, Brooklyn.
J. C. Bean, Jackson, R. 5.
H. B. Kane, Jackson, R. 4.
Leo Woodin, Hanover.
Ivester Young, Jackson, R. 2.
Vill Updyke, Jackson, R. 2.
Jas. W. Dey, Springport.

BENZIE COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

G. L. Dressel,	-	-	-	-	-	-	-	-	-	President.
Joseph Smeltzer,	-	-	-	-	-	-	-	-	-	1st Vice-President.
W. J. Pettitt,	-	-	-	-	-	-	-	-	-	2nd Vice-President.
E. J. Parker,	-	-	-	-	-	-	-	-	-	Secretary.
Allen Case,	-	-	-	-	-	-	-	-	-	Treasurer.

MEMBERS.

George Allen, Frankfort.
Victor Allsberg, Elberta.
Roscoe Burtker, Elberta.
Allen Case, Frankfort.
C. H. Chapman, Frankfort.
N. J. Crawford, Elberta.
George Cornell, Elberta.
Ed. Crawford, Arcadia.
John W. Cruse, Honor.
C. F. Collier, Frankfort.
E. Curtis, Frankfort.
J. L. Chandler, Elberta.
J. F. Conboy, Elberta.
W. L. Davis, Frankfort.
E. Dragoo, Elberta.
G. L. Dressel, Frankfort.
John Ehman, Elberta.
A. Fairchild, Frankfort.
Francis Forrester, Elberta.
M. E. Gavigan, Arcadia.
S. C. Glarum, Elberta.
Carl P. Gregerson, Frankfort.
John Howard, Arcadia.
C. Jacobson, Frankfort.
Mrs. E. L. Johnson, Frankfort.
C. J. Kinney, Frankfort.
C. C. Keillor, Arcadia.
Mrs. M. A. Knapp, Frankfort.
H. A. Lewis, Frankfort.
Wm. Little, Elberta.
E. G. Lord, Arcadia.

Cris. Mathieson, Frankfort.
Peter Mathison, Elberta.
George M. Moore, Frankfort.
George Morency, Frankfort.
R. Mortensen, Arcadia.
J. E. Nelson, Frankfort.
E. M. O'Brien, Thompsonville.
F. W. Palmer, Frankfort.
Byron Parker, Frankfort.
E. J. Parker, Frankfort.
M. D. Persing, Frankfort.
W. J. Pettit, Benzonia.
V. L. Putney, Arcadia.
Wallace, Putney, Arcadia.
R. B. Reynolds, Bendon.
Miss C. H. Rogers, Thompsonville.
Paul Rose, Elberta.
Joseph Smeltzer, Elberta.
Wesley Smeltzer, Elberta.
L. D. Spafford, Lake Ann.
H. A. Sperry, Frankfort.
Haven Talbert, Frankfort.
W. R. Thomas, Frankfort.
Loyd Valleau, Lake Ann.
J. W. Van Deman, Benzonia.
Wm. G. Voorheis, Elberta.
Sam. Willis, Thompsonville.
Byron Wolcott, Elberta.
Seymour Wright, Elberta.
U. S. Young, Frankfort.

MASON COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Smith Hawley,	-	-	-	-	-	-	-	-	-	-	President.
R. J. Fitch,	-	-	-	-	-	-	-	-	-	-	Vice-President.
R. C. Sabin,	-	-	-	-	-	-	-	-	-	-	Secretary-Treasurer.

MEMBERS FOR 1912.

O. E. Hawley, Ludington, R. 3.	Andrew Thompson, Ludington, R. 3.
Wm. Fitch, Ludington, R. 3.	Jerome Harmon, Ludington, R. 1.
C. W. Fitch, Ludington, R. 1.	H. D. Stowell, Ludington, R. 1.
R. C. Sabin, Ludington, R. 3.	J. H. Gamertsfelder & Son, Ludington, R. 1.
C. G. Wing, City.	Wm. Wadel, Ludington, R. 1.
Geo. Cribbs, Ludington, R. 3.	R. J. Fitch, Ludington, R. 3.
A. J. Houk, Ludington, R. 1.	John Rinebolt, Ludington, R. 1.
J. H. Withey, Ludington, R. 1.	Fred Peterson, Ludington, R. 3.
Martin Lund, Ludington, R. 3.	Michael Fitch, Ludington, R. 3.
Wm. Metzler, Ludington, R. 3.	Frank Kibbey, Ludington, R. 3.
J. H. Burns, Ludington, R. 1.	Arthur Morton, Ludington, R. 1.
J. H. Fitch, Ludington, R. 1.	Donald Jameson, Ludington, R. 3.
Wm. Kennedy, Ludington, R. 1.	Gilbert Broder, Ludington, R. 3.
Joseph Sellner, Ludington, R. 1.	Fred Beebe, Ludington, R. 1.
W. F. Curratt, Ludington, R. 3.	Henry Meisenheimer, Ludington, R. 3.
J. A. Gamertsfelder, Ludington, R. 1.	Joe. Pallasch, Ludington, R. 1.
Albert Kinney, Ludington, R. 1.	D. H. Morton, Pentwater, P. O., R. 1.
L. L. McClatchie, Ludington, R. 3.	Jas. McDonald, (no paper).
Louis Hawley, Ludington, R. 3.	C. L. Houk, Ludington, R. 3.
D. H. Grout, Ludington, R. 3.	Jesse Houk, Ludington, R. 3.
Smith Hawley, Ludington, R. 3.	A. R. Benjamin, Ludington, R. 3.
L. B. Lyon, Ludington, R. 3.	Joe. Prevost, Ludington, R. 3.
Theo. Ervin, Ludington, R. 3.	V. L. Olmstead, Ludington, R. 3.

IONIA COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS FOR 1912.

President, Claude Dickerson,	-	-	-	-	-	-	-	-	-	-	Ionia.
Vice-President, Henry L. Nielson,	-	-	-	-	-	-	-	-	-	-	Ionia.
Secretary, Frank E. Hall,	-	-	-	-	-	-	-	-	-	-	Ionia.
Treasurer, Herbert F. Kellogg,	-	-	-	-	-	-	-	-	-	-	Ionia.

MEMBERS.

Herbert F. Kellogg, Ionia.	F. P. Trowbridge, Ionia.
Claude C. Dickerson, Ionia.	Herbert L. Smith, Shiloh.
Geo. E. Dickerson, Ionia.	Jens Jensen, Orleans.
Perry H. Stebbins, Saranac.	H. L. Nielsen, Ionia.
Chas. C. Luce, Ionia.	John Flater, Ionia.
Ray Normington, Ionia.	C. I. Goodwin, Ionia.
Thos. F. Martin, Ionia.	Frank E. Hall, Ionia.
Luther E. Hall, Ionia.	Geo. Gott, Ionia.
Lee P. Spalding, Ionia.	Maurice Yeomans, Ionia.
E. E. Branch, Ionia.	Ivan J. Brooks, Ionia.
H. D. Waldron, Ionia.	Geo. Hulleberger, Saranac.

F. T. Flanagan, Orleans.
 Geo. E. Green, Ionia.
 Chas. Mattison, Ionia.
 James Little, Shiloh.
 J. B. Welch, Ionia.
 E. D. Weaver, Ionia.
 W. W. Bemis, Ionia.
 B. E. Goodwin, Ionia.
 H. B. Webber, Ionia.
 Chas. Stoddard, Ionia.
 J. R. Densmore, Ionia.
 Wm. Robertson, Ionia.
 Chas. North, Fenwick.
 Arthur Wilson, Ionia.
 James A. McCarty, Ionia.
 Harry S. Knapp, Muir.
 J. J. Eaves, Ionia.
 Samuel Eavey, Ionia.

H. R. Bluemley, Butternut.
 Fred Vanderheyden, Ionia.
 Clyde Sigourney, Ionia.
 Fred Glostrick, Ionia.
 D. A. McQuaid, Ionia.
 M. J. Allen, Ionia.
 A. G. Smith, Ionia.
 Elmer Peabody, Shiloh.
 Chas. Begerow, Lake Odessa.
 James Dildine, Ionia.
 P. C. Freeman, Lowell.
 E. H. Hunt, Saranac.
 Fred Kendall, Ionia.
 P. M. Slaybaugh, Orleans.
 B. A. Yeomans, Ionia, R. 4.
 George Sage, Ionia.
 Daniel Slowinski, Lake Odessa, R. 39.

NORTHPORT FRUIT GROWERS' ASSOCIATION.

(Auxiliary to State Society.)

OFFICERS.

R. E. Flood,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	President.
Antoine Bartlett,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Vice-President.
A. Bentall,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Secretary-Treasurer.

MEMBERS.

A. F. Anderson, Omena.
 Bordeaux, Allan, Northport.
 Bordeaux, J. A., Northport.
 Barnes, L. A., Northport.
 Barth, Otto., J Northport, R.
 Barth, Otto G., Northport, R.
 Brown, A., Omena, R.
 Brame & Son, Northport.
 Bartlett, Antoine, Omena, R.
 Baumberger, C. A., Northport.
 Barnes, Dell, Northport, R.
 Brown, J. D., Northport, R.
 Bentall, A., Northport.
 Barth, Walter, Northport, R.
 Bartlett, Wm., Northport, R.
 Bartlett, Oscar, Northport, R.
 Birnbaum, J. W., 11205 Superior Ave.,
 Cleveland, Ohio.
 Bowles, J. H., Northport.
 Brown, W. R., 145 Lake Ave, Grand
 Rapids, Mich.
 Bartlett, Amos, Northport.
 Brace, Julius, Northport.
 Baumberger, Fred, Northport, R.
 Budd, Robert, Northport.
 Chlausen, P., Northport.
 Curran, J. M., 19 S. LaSalle St., Chicago,
 Ill.
 Cutcheon, J. M., Winston, Salem, S. C.
 Dame, G. M., Lansing, Mich.
 Dame, Isa, Northport.
 Dinsmore, E. J., Northport, R.

Egeler, Ph., Northport.
 Foltz, W. N., Omena.
 Flood, D. R. E., Northport.
 Fonda, W. E., 11203 Superior Ave.,
 Cleveland, Ohio.
 Frederickson, Nels, Northport, R.
 Garthe, Isaac, Northport, R.
 Garthe, Esten, Northport, R.
 Garthe, S. C., Northport.
 Garthe, Seth, Northport.
 Gustaff, O. C., Northport.
 Gill, Wm., Northport, R.
 Gorman, W. P., Omena.
 Griffis, R. E., Omena, R.
 Hills, R. E., Delaware, Ohio.
 Holton, J. N., Northport, R.
 Johnson, Alfred, Northport, R.
 Johnson, Adolph, Northport, R.
 Johnson, Fred, Northport, R.
 Joint, C. L., Omena, R.
 Krebs, G. J., Omena, R.
 Kehl, Jas., Northport.
 Kehl, Ed., Northport.
 Kehl, C. B., Northport.
 Kilcherman, E., Northport, R.
 Keyes, S. Omena.
 Leslie, A. M., 201 Main St., Evanston, Ill.
 Lackie, W., Omena, R.
 Maule, Mrs. Anna, Omena, R.
 Middleton, Al., Northport, R.
 Matthews, J. F., Northport.
 Milliken, A. H., Northport.

- | | |
|---|--|
| Mareh, Antoine, Northport, R. | Sanders, D. L., Grand Rapids, Mich. |
| Massa, J. A., Northport. | Sutherland, Rev. J. W., Lansing, Mich. |
| McMachen, A., Omena, R. | Steele, W. F., Northport. |
| Morgan, N. J., Omena, R. | Steele, W. H., Northport. |
| Middleton, Elmer, Northport. | Steele, Geo., Omena, R. |
| Middleton, Frank, Northport, R. | Smith, R. P., Omena, R. |
| Nelson, C. A., Northport, R. | Scott, J. E., Omena, R. |
| Nelson, W. P., Northport, R. | Scott, Hugh, Northport, R. |
| Nelson, Andrew G., Northport, R. | Scott, D. H., Northport. |
| Peck, L. R., Northport. | Scott, Henry, Northport, R. |
| Porter, S. W., Northport. | Scott, Birney, Northport. |
| Putnam, B. J., Northport, R. | Schroeder, M., Northport. |
| Probst, R., Northport, R. | Swanson, Ed., Schomberg, Mich. |
| Purkiss, Thos., Northport, R. | Thomas, Robt., Northport, R. |
| Putnam, J. D., Omena, R. | Thomas, J. J., Northport, R. |
| Peterson, Oscar, Northport, R. | Thomas, W. J., Northport, R. |
| Richner, C. A., Omena, R. | Van Holt, J., Omena, R. |
| Ranger, Irving, Northport, R. | Voice, Walter, Northport. |
| Rogers, L., Northport, R. | Wurzburg, P., Northport. |
| Sargent, Rev. C. S., 2117 Talbott Ave.,
Indianapolis, Indiana. | Warnquist, A., Northport, R. |
| Smith, L. C., Northport, R. | Wiley, Robt., Omena. |
| | Wheeler, L. H., Omena. |

LIFE MEMBERS OF THE STATE HORTICULTURAL SOCIETY.*

* NOTE.—A Life membership which was formerly \$10 is now \$5. The fund thus gathered is invested in good securities and only the interest employed for *general* purposes. The Secretary desires information as to the death or change of address of any life member. Notice of the death of a member should be accompanied by a sketch of the life of the deceased one, to be entered in the records of the State Society.

Name.	P. O. Address.	County.
Adams, H. Dale.....	Galesburg.....	Kalamazoo.
Adams, Mrs. H. Dale.....	Galesburg.....	Kalamazoo.
Aldrich, Geo. C.....	Bravo.....	Allegan.
Allis, E. W.....	Adrian.....	Lenawee.
Allis, Miss Mary C. (Mrs. Beal).....	Adrian.....	Lenawee.
Ansley, C. F.....	Iowa City.....	Iowa.
Armitage, James.....	Monroe.....	Monroe.
Arnold, W. D.....	Ionina.....	Ionina.
Aveline, J. B., Rural 5.....	Montague.....	Muskegon.
Bailey, L. H., Jr.....	Ithaca.....	New York.
Baker, Klaus, Rural 11, Box 97.....	Holland.....	Ottawa.
Baldwin, O. A. D.....	Bridgman.....	Berrien.
Ballard, Ralph, Rural 4.....	Niles.....	Berrien.
Barden, F. M., Rural 6.....	South Haven.....	Van Buren.
Barnhart, Herbert, Rural 1.....	Fremont.....	Newaygo.
Bartram, Burr, Rural 4.....	Benton Harbor.....	Berrien.
Bassett, Chas. E.....	Fennville.....	Allegan.
Bates, T. T.....	Traverse City.....	Grand Traverse.
Bauman, F. A., Rural 13.....	Grand Rapids.....	Kent.
Baumann, Archie J.....	New Richmond.....	Allegan.
Beal, J. L.....	Addison.....	Lenawee.
Beal, W. J.....		Massachusetts.
Becker, D. N., Star Route.....	Hesperia.....	Oceana.
Beckman, Geo. H., Rural 3.....	Ludington.....	Mason.
Bennett, S. Oscar.....	Holland.....	Ottawa.
Bishop, Dr. H. A.....	Millington.....	Tuscola.
Blain, A. W., Supt. Elmwood Cemetery.....	Detroit.....	Wayne.
Blue, George.....	Traverse City.....	Grand Traverse.
Bowker Insecticide Co., 43 Chatham St.....	Boston.....	Massachusetts.
Bowles, J. H.....	Northport.....	Leelanau.
Brackett, G. B.....	Washington.....	D. C.
Brassert, Walter O., Rural 1.....	Paw Paw.....	Van Buren.
Bristol, W. H.....	Almont.....	Lapeer.
Brown, F. E.....	Traverse City.....	Grand Traverse.
Brown, G. L. A.....	Decatur.....	Van Buren.
Brubaker, C. S.....	Hartford.....	Van Buren.
Bruchner, Geo. W.....	Monroe.....	Monroe.
Brunson, Dr. E. E.....	Ganges.....	Allegan.
Bryant, C. T.....	South Haven.....	Van Buren.
Buckman, R. M.....	Sodus.....	Berrien.
Bullock, A. M.....	Lapeer.....	Lapeer.
Burham, W. P.....	Ionina.....	Ionina.

Name.	P. O. Address.]	County.
Burton, Turley J.	Mitchell.	<i>Indiana.</i>
Burrows, Geo. L., Jr.	Saginaw City.	Saginaw.
Buskirk, M. D.	Paw Paw.	Van Buren.
Caie, Robt.	Yarmouth.	<i>Nova Scotia.</i>
Chamberlain, Glenn R., Gas Co.	Grand Rapids.	Kent.
Chandler, L. F.	Almont.	Lapeer.
Chapman, Austin B.	South Rockwood.	Monroe.
Chatfield, Geo. E.	South Haven.	Van Buren.
Cheney, Calvin A.	Maple City.	Leelanau.
Chilson, Nathaniel.	Tower City.	<i>Dakota.</i>
Chilson, Miss Ida.	Tower City.	<i>Dakota.</i>
Church, Wm. E., Title & Trust Bldg.	Chicago.	<i>Illinois.</i>
Coith, Alwin.	South Haven.	Van Buren.
Collins, G. H.	Hartford.	Van Buren.
Cook, A. J.	Claremont.	<i>California.</i>
Cook, C. B.	Owosso.	Shiawassee.
Cook, W. N.	Grand Rapids.	Kent.
Cooper, Madison.	Calceum.	<i>New York.</i>
Countryman, E. J., 111 Galena Ave.	Dixon.	<i>Illinois.</i>
Crane, John H., R. F. D. 1.	Fennville.	Allegan.
Crawford, Robt. J.	Armada.	Macomb.
Curtice, J. E.	Coleman.	Midland.
Darlington, Frank, Rural 4.	Hesperia.	Oceana.
Davidson, C. M. & Co.	Rockwood.	<i>Ohio.</i>
Davis, Horace W.	Lapeer.	Lapeer.
Davis, W. H.	Perrinton.	Gratiot.
Dayton, J. H.	Painesville.	<i>Ohio.</i>
Deamud, J. B., 51 Wabash Ave.	Chicago.	<i>Illinois.</i>
Decker, Walter E., Rural 20.	Orleans.	Ionias.
Dickerson, Claude C., Route 1.	Ionias.	Ionias.
Dickerson, F. B.	Detroit.	Wayne.
Dickerson, Geo. E., Stage Route.	Ionias.	Ionias.
Dieckman, Mrs. Josephine M.	East Saginaw.	Saginaw.
Dietrich, M. J.	Beulah.	Benzie.
Doyle, Thomas.	Monroe.	Monroe.
DuMez, John.	Holland.	Ottawa.
Dutton, Chas. S.	Holland.	Ottawa.
Dykman, J.	East Saginaw.	Saginaw.
Eckard, W. C.	Eaton Rapids.	Eaton.
Edwards, O. C. (sanitarium).	Battle Creek.	Calhoun.
Elsworth, R. H.	Traverse City.	Grand Traverse.
Ernsberger, R. J.	Watervliet.	Berrien.
Farley, Fred.	Almont.	Lapeer.
Farrand, T. A.	Eaton Rapids.	Eaton.
Field, Wm. A.	South Chicago.	<i>Illinois.</i>
Flowerday, Robert.	Detroit.	Wayne.
Fraleigh, J. O.	Cashovia.	Muskegon.
France, J. G.	Marshall.	Calhoun.
Freeman, Mrs. Agnes, 325 E. Jefferson.	Ann Arbor.	Washtenaw.
Freund, Chas.	St. Joseph.	Berrien.
Friday, George.	Coloma.	Berrien.
Friday, Jacob.	Coloma.	Berrien.
Frost, Frank H., Rural 6.	South Haven.	Van Buren.
Garfield, Chas. W.	Grand Rapids.	Kent.
Gathman, Mrs. Augusta, 1103 Grace St.	Chicago.	<i>Illinois.</i>
Gebhardt, Benton.	Hart.	Oceana.
Geddes, David.	Saginaw.	Saginaw.
Geisler, Wm., Rural 2, box 92.	St. Joseph.	Berrien.
Getz, Geo. F., Lakewood Farm.	Holland.	Ottawa.

Name.	P. O. Address.	County.
Gephart, H. W.	Hart.	Oceana.
Gibson, Mrs. W. K.	Jackson.	Jackson.
Graham, Elwood.	Grand Rapids.	Kent.
Graham, Dr. M.	Jonesville.	Hillsdale.
Grand Traverse Fruit Co., 1008 Ford Bldg.	Detroit.	Wayne.
Grant, John F., 2710 Indiana Ave.	Chicago.	<i>Illinois.</i>
Gray, W. B.	Traverse City.	Grand Traverse.
Green, S. A.	Hillsdale.	Hillsdale.
Greening, Charles E.	Monroe.	Monroe.
Greening, J. C.	Monroe.	Monroe.
Hale, Charles F., Rural 11.	Grand Rapids.	Kent.
Hall, Alfred R., R. F. D 4.	Buchanan.	Berrien.
Hall, Louis A., Rural 1.	Berlin.	Kent.
Hall, Luther E.	Ionia.	Ionia.
Halstead, J. B.	Farmington.	Oakland.
Habegger, Louis.	Woodburn.	<i>Indiana.</i>
Hamilton, Frank C.	Northville.	Wayne.
Hamlin, J. H., Rural 1.	Bravo.	Allegan.
Hawley, George A.	Hart.	Oceana.
Hawxhurst, W. F.	Saline.	Washtenaw.
Hayes, N. B.	Muir.	Ionia.
Hayden, Mrs. H. A.	Jackson.	Jackson.
Heinze, Edward F., R. F. D. 2.	St. Joseph.	Berrien.
Hemstreet, F. H.	Bellaire.	Antrim.
Heuser, J. H., 1262 Monadnock Bldg.	Chicago.	<i>Illinois.</i>
Hill, R. Carroll.	Coldwater.	Branch.
Hinebaugh, Wm. H.	Ottawa.	<i>Illinois.</i>
Hoffman, Mrs. Mary Dickinson.	St. Joseph.	Berrien.
Hoffman, M., Rural 2.	St. Joseph.	Berrien.
Hogue, H. H., Rural 1.	Sodus.	Berrien.
Holloway, Geo. F.	Sawyer.	Berrien.
Hoopes, Abner.	West Chester.	<i>Pennsylvania.</i>
Hopkins, A. L.	Bear Lake.	Manistee.
Hosner, O. G., Rural 1.	Oxford.	Oakland.
Howard, J. H.	Arcadia.	Manistee.
Howe, J. C.	Old Mission.	Grand Traverse.
Hubbard, Geo. M., Rural 1.	Jenison.	Ottawa.
Huey, Harold E., Rural 2.	Shelby.	Oceana.
Hughston, J. A., Lock Box 16.	Grand Rapids.	Kent.
Hunt, L. C.	Eaton Rapids.	Eaton.
Husted, Noah P.	Lowell.	Kent.
Hutchins, Edward, R. F. D. 1.	Fennville.	Allegan.
Ilgensfritz, C. A.	Monroe.	Monroe.
Ives, Caleb.	Monroe.	Monroe.
Jaquay, Irving.	Buchanan.	Berrien.
Jenks, S. G., Rural 3.	Shelby.	Oceana.
Jerome, Mrs. David H.	Saginaw.	Saginaw.
Johnson, R. L.	Lawrence.	Van Buren.
Johnson, William.	Vassar.	Tuscola.
Kales, Dr. John D., Savings Bank Bldg.	Chicago.	<i>Illinois.</i>
Keasey, E. L.	South Haven.	Van Buren.
Keith, B. H.	Sawyer.	Berrien.
Keith, Bert W.	Winona Lake.	<i>Indiana.</i>
Kellogg, Herbert.	Ionia.	Ionia.
Kelly Bros.	Dansville.	<i>New York.</i>
Kempf, Geo. J.	Tecumseh.	Lenawee.
Kennedy, Thos., Rural 3.	Hesperia.	Oceana.

Name.	P. O. Address.	County.
Kennedy, Wm., Rural 3	Hesperia	Oceana.
Keppel, Thos.	Zeeland	Ottawa.
Kettle, Burt.	Coopersville	Ottawa.
Kidd, J. H.	Ionia	Ionia.
Kingsley, H. J.	Fennville	Allegan.
Klien, F. J., Rural 1	Farmington	Wayne.
Kniebes, C. C.	Watervliet	Berrien.
Knight, David & Son.	Sawyer	Berrien.
Kniseley, A. J.	Benton Harbor	Berrien.
Krebs, Geo. J.	Northport	Wayne.
Ladd, E. O.	Old Mission	Grand Traverse.
Lasch, A. A., Rural 2	Suttons Bay	Leelanau.
Lass, Peter H., Rural 1	Bear Lake	Manistee.
Lawrence, F. E.	Cressey	Barry.
Lawrence, L. L.	Decatur	Van Buren.
Leggett, E. E.	Fennville	Allegan.
Lindsley, Geo. W.	Harbor Springs	Emmet.
Lincoln, L. C.	Greenville	Montcalm.
Lincoln, Mrs. L. C.	Greenville	Montcalm.
Loomis, P. B.	Jackson	Jackson.
Lord, E. G., Box 56 Rural	Arcadia	Manistee.
Low, Geo. M.	Bangor	Van Buren.
Macaulay, T. B.	Montreal	Canada.
Magill, R. M., 159 LaSalle St.	Chicago	Illinois.
Maguire, H. W., 7116 Deyo St.	Jackson	Jackson.
Maguire, John	Pontiac	Oakland.
Mann, Clyde Alison, Rand-McNally Bldg.	Chicago	Illinois.
Mann, S. B.	Glenwood	Florida.
Marshall, William A.	Old Mission	Grand Traverse.
Marshall, W. C., 128 So. Sacramento Blvd.	Chicago	Illinois.
Mason, L. M.	East Saginaw	Saginaw.
Mason, Mrs. Sarah A.	East Saginaw	Saginaw.
Matheson, Frank, Rural 1	Elberta	Benzie.
Mead, A. F., Rural 11	Battle Creek	Calhoun.
Merritt, H. E., Rural 2	South Haven	Van Buren.
Merritt, J. E.	Manistee	Manistee.
Messer, G. W.	Almont	Lapeer.
Methven, C. S.	Holland	Ottawa.
Miller, Chas. H.	Glen Arbor	Leelanau.
Miller, Frank A.	Northville	Wayne.
Miller, John T.	Birmingham	Oakland.
Mitchell, James	Almont	Lapeer.
Monat, Lawrence, Jr., 1540 Hawthorne Terrace	Berkeley	California.
Monroe, C. J.	South Haven	Van Buren.
Monroe, Mrs. Clara O.	South Haven	Van Buren.
Montague, A. K.	Traverse City	Grand Traverse.
Moore, Mrs. Samuel C.	Muskegon	Muskegon.
Moore, J. H.	Iansing	Ingham.
Morgan, Samuel M., 1301 Ashland Block.	Chicago	Illinois.
Morrow, R. E.	Central Lake	Antrim.
Morse, Miss Anna, Rural 1	Old Mission	Grand Traverse.
Mullen, James	Manistee	Manistee.
Munson, J. Pomeroy, Knapp Ave.	Grand Rapids	Kent.
Murray, James P., Rural 7	Albion	Calhoun.
Myhan, Geo. H.	South Haven	Van Buren.
McCallum, Neil	Hesperia	Oceana.



Four acres of Alfalfa on O. F. Marvin farm near Holton, Muskegon county. Yield 19 tons in 1911 and same in 1912.



Barns and silo of O. F. Marvin, Holton.

Name.	P. O. Address.	County.
McClarchie, G. C.	Ludington.	Mason.
McCutcheon, R. F.	Big Rapids.	Mecosta.
McGuire, J. Fred, 101 Washington St.	Chicago.	Illinois.
McHardy, A. J.	Almont.	Lapeer.
McNaughton, Robert T.	Jackson.	Jackson.
Nabors, Nellie S.	Flint.	Genesee.
Nall, Louis A.	Williamsburg.	Grand Traverse.
Neff, David.	Ravenna.	Muskegon.
Neilsen, Henry L.	Ionla.	Ionla.
Nelson, C. A.	Northport.	Leelanau.
Newhall, Benj., 840 Otis Bldg.	Chicago.	Illinois.
Newhall, John.	Thompsonville.	Benzie.
Nichols, W. W., Geddes Ave.	Ann Arbor.	Washtenaw.
Nicol, Jas., Braeside Fruit Farm.	South Haven.	Van Buren.
Noble, W. A.	Monroe.	Monroe.
O'Donald, R. H.	Howard City.	Montcalm.
Olney, B. J.	Reeman.	Newaygo.
Overton, F. J.	Bangor.	Van Buren.
Overton, Miller.	Bangor.	Van Buren.
Palmer, W. S.	Kalkaska.	Kalkaska.
Palmer, Thomas W.	Detroit.	Wayne.
Pancost, C. E., Rural 6.	Lansing.	Ingham.
Partridge, Newton A., Room 53, No. 54 W. Randolph St.	Chicago.	Illinois.
Partridge, Newton L., 611 W. Illinois St.	Urbana.	Illinois.
Pease, F. D.	Sparta.	Kent.
Pennell, Ray L., Box C.	Traverse City.	Grand Traverse.
Perry, George L.	Mt. Pleasant.	Isabella.
Perry, Jacob H.	Goodison.	Oakland.
Petersen, J. M.	Manistee.	Manistee.
Petersen, Oscar H.	Northport.	Leelanau.
Petty, Thos.	Spring Lake.	Ottawa.
Pierce, Geo. W., Box 235.	Harbor Beach.	Huron.
Pierce, N. B.	Ludington.	Mason.
Port, Geo. L.	Coloma.	Berrien.
Post, L. J.	Lowell.	Kent.
Pratt, C. A.	Benton Harbor.	Berrien.
Pratt, W. M.	Benton Harbor.	Berrien.
Prenjiss, Judge Wm.	Bravo.	Allegan.
Preston, Wm. F.	Fremont.	Newaygo.
Prettyman, O. G., Rural 4.	Scottville.	Mason.
Pugsley, M. H.	Paw Paw.	Van Buren.
Ramsdell, Dr. L. S.	Manistee.	Manistee.
Ranney, D. D.	Leslie.	Ingham.
Rasmussen, R. J., Box 416.	Marlette.	Sanilac.
Read, G. P., 119 Duane St.	New York.	New York.
Reed, P. A.	Beulah.	Benzie.
Reynolds, E. H.	Monroe.	Monroe.
Reynolds, H. G.	Pasadena.	California.
Richmond, E. D.	Pentwater.	Oceana.
Ricker, Dr. John D.	Pontiac.	Oakland.
Rider, Ralph, Rural 3.	Hart.	Oceana.
Robbins, W. H., Rural 4.	Bangor.	Van Buren.
Robischung, H. B.	Cloverdale.	Barry.
Robotham, Jay.	Beulah.	Benzie.
Rockey, Clyde W.	St. Joseph.	Berrien.
Rogers, A. J., Jr.	Beulah.	Benzie.

Name.	P. O. Address.	County.
Rogers Bros., Box 452.....	Alpena.....	Alpena.
Rowe, Geo. E., R. F. D. 11.....	Grand Rapids.....	Kent.
Ruckmann, H. P., Star Route.....	Hesperia.....	Oceana.
Russell, C. N.....	Manistee.....	Manistee.
Russell, Edwin.....	Manistee.....	Manistee.
Russell, Dr. Geo. B.....	Detroit.....	Wayne.
Russell, J. B.....	Wheaton.....	Illinois.
Rust, C. E.....	Ionia.....	Ionia.
Samuelson, Norman L., 1811 W. Madison..	Chicago.....	Illinois.
Satterlee, James.....	Lansing.....	Ingham.
Scales, J. C. & C. R., So. Water St.....	Chicago.....	Illinois.
Schenbeck, Edwin L., Rural 3.....	Hesperia.....	Oceana.
Schreiber, Thor, Rural 2.....	Fennville.....	Allegan.
Scott, Dr. Austin.....	New Brunswick.....	New Jersey.
Scott, Mrs. C. W.....	Grand Rapids.....	Kalamazoo.
Scott, E. H.....	Ann Arbor.....	Washtenaw.
Seudder, C. B.....	Augusta.....	Kalamazoo.
Sessions, Charles A.....	Mears.....	Oceana.
Sessions, Horace.....	Shelby.....	Oceana.
Sessions, William.....	Ionia.....	Ionia.
Sheffield, Wm. E. & Co.....	Benton Harbor.....	Berrien.
Shepard, Leon, 13 Julia St.....	Grand Rapids.....	Kent.
Sheridan, John.....	Hudsonville.....	Ottawa.
Sherwood, R. H.....	Watervliet.....	Berrien.
Sherk, Ralph, 151 Clinton St.....	Grand Rapids.....	Kent.
Shirley, W. H., Rural 8.....	Allegan.....	Allegan.
Simmons, F. P., Rural 1.....	Northville.....	Wayne.
Sisters of St. Joseph, Nazareth Academy..	Kalamazoo.....	Kalamazoo.
Skinner, Dr. E. P., Chicago Savings Bank Bldg.	Chicago.....	Illinois.
Sly, Miss Addie.....	Birmingham.....	Oakland.
Smeltzer, Joseph.....	Elberta.....	Benzie.
Smith, D. W., 175 W. Kirby Ave.....	Detroit.....	Wayne.
Smith, Henry, Cor. Monroe and Division..	Grand Rapids.....	Kent.
Smith, E. T.....	Ionia.....	Ionia.
Smith, Howard B.....	Winona.....	Ontario.
Smith, H. H.....	Jackson.....	Jackson.
Smith, N. E.....	Ionia.....	Ionia.
Smythe, R. A.....	Benton Harbor.....	Berrien.
Snyder, Wm. E.....	Hart.....	Oceana.
Soule, J. B.....	Fruitport.....	Muskegon.
Southack, Fred W., Box 282.....	Hammond.....	Indiana.
Stahelin, R. J.....	St. Joseph.....	Berrien.
Stearns, J. N.....	Kalamazoo.....	Kalamazoo.
Stearns, W. E.....	Chicago.....	Illinois.
Steele, Julius, Rural 2.....	St. Joseph.....	Berrien.
Steere, B. W.....	Carthage.....	Indiana.
Sterling, F. S.....	Monroe.....	Monroe.
Sterling, J. C.....	Monroe.....	Monroe.
Sterling, W. C.....	Monroe.....	Monroe.
Sterling, W. P.....	Monroe.....	Monroe.
Sterling, Mrs. Emma M.....	Monroe.....	Monroe.
Streator, H. D.....	Galesburg.....	Kalamazoo.
Stroven, Harry.....	Fremont.....	Newaygo.
Stuckey, C. C., Rural 3.....	Hesperia.....	Oceana.
Swanson, Edward.....	Schomburg.....	Leelanau.
Tallant, C. W.....	Shelby.....	Oceana.

Name.	P. O. Address.	County.
Taylor, R. L.....	Lapeer.....	Lapeer.
Thayer, Mrs. Celia.....	Benton Harbor.....	Berrien.
Thayer, Mrs. Dora.....	Benton Harbor.....	Berrien.
Thomas, H. F.....	Jackson.....	Jackson.
Thomas, R. G.....	Three Oaks.....	Berrien.
Thompson, T. G.....	Benton Harbor.....	Berrien.
Thompson, W. D.....	Jackson.....	Jackson.
Tilley, John S.....	Watervliet.....	New York.
Toland, F. J.....	Ludington.....	Mason.
Tracy, Will W.....	Washington.....	D. C.
Tyler, Comfort A.....	Coldwater.....	Branch.
Upham, Miss Mary C., Rural 1.....	Old Mission.....	Grand Traverse.
Van Nordsall, Fred.....	Three Rivers.....	St. Joseph.
Vaughan, Leonard H., 84 Randolph St.....	Chicago.....	Illinois.
Vaught, L. O.....	Jacksonville.....	Illinois.
Vick, James, Jr.....	Rochester.....	New York.
Vick, Frank H.....	Rochester.....	New York.
Vick, E. Colston.....	Rochester.....	New York.
Von Herff, Baron, 444 Monadnock Block.....	Chicago.....	Illinois.
Wadsworth, W. R.....	Lapeer.....	Lapeer.
Wagner, G. M. H. & Sons.....	Chicago.....	Illinois.
Waite, Gilbert M.....	Paw Paw.....	Van Buren.
Wait, Walter J.....	Sturgis.....	St. Joseph.
Walton, L. B.....	Attica.....	Lapeer.
Walton, T. B., 1426 Republic Bldg.....	Chicago.....	Illinois.
Warren, W. H. & Son.....	Ravenna.....	Muskegon.
Watkins, L. Whitney.....	Manchester.....	Washtenaw.
Watkins, L. D.....	Manchester.....	Washtenaw.
Webber, Miss Francis E.....	East Saginaw.....	Saginaw.
Welch, Chas. B., R. F. D. 2.....	Fennville.....	Allegan.
Wells, Frank D., R. F. D. 3.....	Rochester.....	Oakland.
Western, John, 45 State St.....	Detroit.....	Wayne.
Wheeler, D. F.....	Ionia.....	Ionia.
White, O. K.....	East Lansing.....	Ingham.
Whitney, Granger.....	Williamsburg.....	Grand Traverse.
Whitten, C. E.....	Bridgman.....	Berrien.
Whittlessey, John.....	St. Joseph.....	Berrien.
Weir, Antoine.....	Monroe.....	Monroe.
Wilde, Thomas.....	Coopersville.....	Ottawa.
Wilde, Chas., R. F. D. 2.....	Grand Rapids.....	Kent.
Wilder, L. E., Rural 2.....	Grand Rapids.....	Kent.
Wilken, F. A, Care Michigan Farmer.....	Detroit.....	Wayne.
Williams, S. P.....	Monroe.....	Monroe.
Willabee, A. M., Rural 1.....	Old Mission.....	Grand Traverse.
Wilson, Archie.....	Beulah.....	Benzie.
Wilson, F. W., Care DuPont Powder Co.....	Wilmington.....	Delaware.
Wilson, J. B., Rosedale Farm.....	Coloma.....	Berrien.
Wilson, William.....	Beulah.....	Benzie.
Witmer, A. B.....	Brown City.....	Sanilac.
Witmer, John.....	Brown City.....	Sanilac.
Wooding, Charles F.....	Lowell.....	Kent.
Woodruff, A. N.....	Watervliet.....	Berrien.
Woodward, David.....	Clinton.....	Lenawee.
Wundt, K. R.....	Burlington.....	Iowa.
Young, A. M.....	Shelbyville.....	Allegan.
Ziegler, J. C.....	Saginaw City.....	Saginaw.

ANNUAL MEMBERS.

Name.	P. O. Address.	County.
Abbey, Will.	Rives Junction.	Jackson.
Bagley, Wm. D.	Old Mission.	Grand Traverse.
Beach, L. H.	Ludington.	Mason.
Blackman, W. L., Rural 1.	Traverse City.	Grand Traverse.
Blandford, Harry	Fremont.	Newaygo.
Bos, A.	Hudsonville.	Ottawa.
Braman, O. W., Rural 4.	Grand Rapids.	Kent.
Brown, A. N., Care Fruit Belt.	Grand Rapids.	Kent.
Brown, E. H., Box 211.	Benzonia.	Benzie.
Brown, H. L.	Parma.	Jackson.
Bull, John, Rural 1.	Casnovia.	Muskegon.
Camp, G. L.	Midland.	Midland.
Chesbro, C. C., Rural 3.	South Haven.	Van Buren.
Chittenden, Miss Ida L.	Lansing.	Ingham.
Clark, J. L.	Schoolcraft.	Kalamazoo.
Clark, W. W.	Beulah.	Benzie.
Conrad, Seth.	Wayland.	Allegan.
Converse, W. H., Rural 22.	Augusta.	Kalamazoo.
Cook, A. B.	Owosso.	Shiawassee.
Cook, Mrs. C. B.	Owosso.	Shiawassee.
Culp, Wm.	Athens.	Calhoun.
Cutter, Augusta W., 457 Thomas St.	Grand Rapids.	Kent.
Davies, G. A.	Lansing.	Ingham.
Dobson, A. S., Grant St.	Traverse City.	Grand Traverse.
Dowd, A. J., Rural 4.	Hartford.	Van Buren.
Earle, W. K.	Honor.	Benzie.
Eddy, E. B., Rural 1.	Grand Junction.	Van Buren.
English, Geo. T.	Chelsea.	Washtenaw.
Eustace, Prof. H. J.	East Lansing.	Ingham.
Evernden, S. W., Rural 1.	Traverse City.	Grand Traverse.
Ewald, Henry.	Benton Harbor.	Berrien.
Fischer, B. C.	Leslie.	Ingham.
Fisher, Prentice.	Rives Junction.	Jackson.
Garber, Otto R.	Essexville.	Bay.
Gibson, John I., 447 Wealthy St.	Grand Rapids.	Kent.
Goebig, Gustav, Rural 4.	Shelby.	Oceana.
Golder, W. A.	Whitehall.	Muskegon.
Gray, A. P.	Traverse City.	Grand Traverse.
Guile, C. S.	Bellaire.	Antrim.
Gunson, T. H.	East Lansing.	Ingham.
Hamilton, Harry.	Bangor.	Van Buren.
Handy, Fred.	Sodus.	Berrien.
Hankerd, Chas. J.	Munith.	Jackson.
Hawley, H. E.	South Haven.	Van Buren.
Helsel, F., Rural 2.	Grand Rapids.	Kent.
Hilton, C. H., Box 1003.	Benton Harbor.	Berrien.
Hodge, M. H.	Eastport.	Antrim.
Holley, M. B.	Traverse City.	Grand Traverse.
House, E. H., Rural 1.	East Saugatuck.	Allegan.
Humphreys, J. E.	Casnovia.	Muskegon.
Hunsberger, George, Rural 5.	Saginaw.	Saginaw.
Hunt, C. M.	Eaton Rapids.	Eaton.
Hunter, L. R.	South Lyons.	Oakland.
Hutchinson, M. C.	Fennville.	Allegan.
Ingraham, Miss M. S.	Old Mission.	Grand Traverse.
Isbell, B. F.	Central Lake.	Antrim.
Jacobs, G. E.	Sparta.	Kent.

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Name.	P. O. Address.	County.
Johnson, C. D.	Chelsea	Washtenaw.
Jones, A. L., Rural 39	Lake Odessa	Ionia.
Keister, H. A., Rural 3	Bangor	Van Buren.
Keister, W. E.	Hudson	Lenawee.
Kelley, Joseph L.	South Haven	Van Buren.
Kendrick, C. S., Rural 3	Blissfield	Lenawee.
Kendrick, Mrs. C. S.	Blissfield	Lenawee.
Kennedy, Dan J.	St. Louis	Gratiot.
Kettle, Henry	Coopersville	Ottawa.
La Duke, L. B.	Lawrence	Van Buren.
Landon, A. L.	Springport	Jackson.
Lincoln, E. W.	Greenville	Montcalm.
Linsley, T. H., Rural 1	Traverse City	Grand Traverse.
Loeffler, C. W., Rural 2	Cedar	Leelanau.
Lymburner, H. A., Rural 21	Sparta	Kent.
Manwarring, E. B.	Ann Arbor	Washtenaw.
Maris, Bert G.	Eastport	Antrim.
Marvin, O. F.	Holton	Muskegon.
Massa, James A.	Northport	Leelanau.
Mawby, R. G., Rural 9	Grand Rapids	Kent.
Mechem, Geo. B.	Fennville	Allegan.
Merritt, H. E., Rural 2	South Haven	Van Buren.
Mills, J. G., Rural 1	Old Mission	Grand Traverse.
Malloy, Wm.	Grand Rapids	Kent.
Morgan, W. J.	Saginaw	Saginaw.
Morgan, Dr. W. P.	Saginaw, W. S.	Saginaw.
Morrill, Roland	Benton Harbor	Berrien.
Mumford, Dr. Eben	Lansing	Ingham.
Munson, Wm. K., Knapp Avenue	Grand Rapids	Kent.
McClary, O. R.	Empire	Leelanau.
McMullen, D. H., Rural 1	Traverse City	Grand Traverse.
Newberg, Carl, Rural 2	Grand Rapids	Kent.
Noon, M. L.	Grass Lake	Jackson.
Older, L. E.	Adrian	Lenawee.
Parker, E. J.	Frankfort	Benzie.
Pickford, I. T.	Empire	Leelanau.
Porter, Frank L., 6th and Union Sts.	Traverse City	Grand Traverse.
Pullen, W. S.	Hillsdale	Hillsdale.
Quantrell, W. R.	Charlotte	Eaton.
Randall, Mark	Maple City	Leelanau.
Reynolds, R. B., Rural 1	Bendon	Benzie.
Rocher, Abel de	Berlambont	Van Buren.
Rohs, Paul P., Rural 1	Empire	Leelanau.
Rottier, John	Fremont	Newaygo.
Rouse, F. O.	Shelby	Oceana.
Shaw, E. E.	Grand Junction	Van Buren.
Sanford, F. H.	East Lansing	Ingham.
Smith, C. E.	Grand Rapids	Kent.
Somers, F. W., Hoffman Apts.	Grand Rapids	Kent.
Sours, Lowell	Elk Rapids	Antrim.
Spencer, A. G.	Kibbie	Van Buren.
Sperry, Caroline, 514 Thompson St.	Ann Arbor	Washtenaw.
Stickney, Mrs. C. F., Rural 1	Traverse City	Grand Traverse.
Stone, A. G.	Niles	Berrien.
Straight, Geo. W., Rural 11	Holland	Ottawa.
Swanson, Peter, Rural 1	Schomberg	Leelanau.

Name.	P. O. Address.	County.
Swanson, Peter, Jr., Rural 1.....	Maple City.....	Leelanau.
Taft, Prof. L. R.....	East Lansing.....	Ingham.
Taylor, C. B., 117 No. Oak St.....	Traverse City.....	Grand Traverse.
Taylor, Miss Grace, Rural 2.....	Fennville.....	Allegan.
Titus, L. F.....	Traverse City.....	Grand Traverse.
Tompkins, S. B.....	Old Mission.....	Grand Traverse.
Tompkins, W. G.....	Old Mission.....	Grand Traverse.
Turner, Robert L., 692 Lincoln Ave.....	Niles.....	Berrien.
Umlor, W. H.....	Traverse City.....	Grand Traverse.
Van Allen, E. 80 So. 3rd St.....	Columbus.....	Ohio.
Van Deman, John W.....	Benzonia.....	Benzie.
Wakeman, Arthur.....	Bangor.....	Van Buren.
Waller, H.....	Charlevoix.....	Charlevoix.
Warner, Frank, Rural 5.....	South Haven.....	Van Buren.
Wedge, Geo. W., Rural 2.....	Grand Rapids.....	Kent.
Whener, J. J., 7551 Sangamon St.....	Chicago.....	Illinois.
Welch, H. G., Rural 2.....	Fennville.....	Allegan.
Welsh, Geo. W.....	Grand Rapids.....	Kent.
Wermuth, Mrs B., 456 Townsend Ave.....	Detroit.....	Wayne.
Winne, Louis.....	Bangor.....	Van Buren.
Wolverine Nursery Co.....	Paw Paw.....	Van Buren.
Young, C. E.....	Rives Junction.....	Jackson.
Zander, H. O.....	Ada.....	Kent.

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